WESTERN GAS

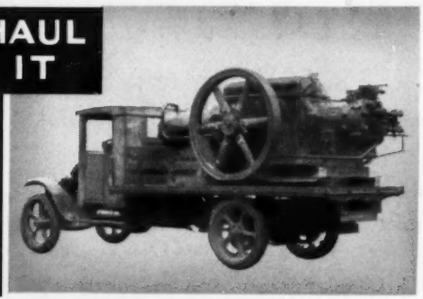
March 1930

20 Cents the Copy

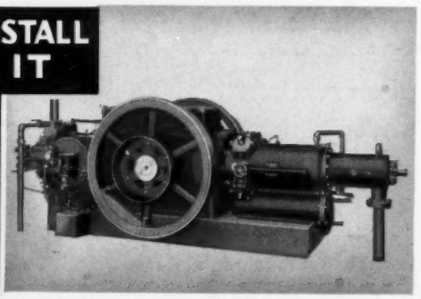
COOPER-BESSEMER TYPE-16

GAS OR FULL DIESEL

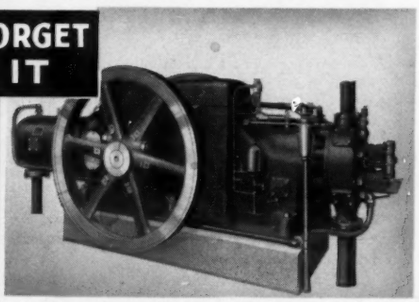
HAUL IT



INSTALL IT



FORGET IT



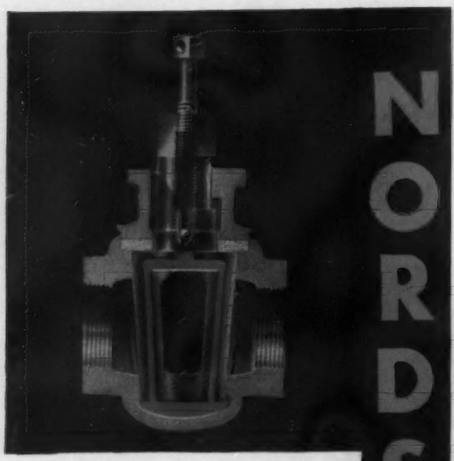
THREE years of hard work in compressor service have demonstrated the ability of this 50-60 B. H. P. unit to thrive on the load. For single or two-stage compressor cylinders, for regular or semi-automatic operation, for direct or belt-drive, convertible from gas to oil fuel. Timken main roller bearings. Die forged crank shaft. Yoke type compressor drive. Easily adjustable chain driven lay shaft.

Write for bulletin.

The Cooper-Bessemer Corporation
Formerly The C. & G. Cooper Co. and The Bessemer Gas Engine Co.
Mount Vernon, Ohio Grove City, Pa.
Branch offices in all principal oil and gas fields

YOU'RE ALWAYS SAFE IN CHOOSING A COOPER-BESSEMER

A MONTHLY JOURNAL DEVOTED TO THE WESTERN GAS & APPLIANCE INDUSTRIES



NORDSTROM VALVES

MERCO

WINNING SLOGANS

for

NORDSTROM VALVES

Announced . . . .

First Award ($250.00)

Nordstrom—The Perfect Application of a Principle

Submitted by J. L. PILLOW, *Standard Oil Co. of La., Baton Rouge, La.*

Second Award ($100.00)

Hydraulic Lubrication Insures Effective Manipulation

Submitted by G. E. GENUNG, *13326 Terry Ave., Detroit, Mich.*

Third Award ($50.00)

Fabricated and Lubricated for Long Life

Submitted by G. C. BEMIS, JR., *American Smelting & Refining Co., Santa Barbara, Chihuahua, Mexico*

Fourth to Eighth Awards ($10.00 Each)

Won't Leak, Won't Stick, Lubrication Does the Trick

Submitted by T. S. BARLOW, *501 East 21st St., New York City*

The Valve Controls the Flow, the Screw Controls the Valve

Submitted by HENRY A. WEBBER, *2331 Donald St., Ames, Iowa*

The Turn of a Screw Pushes Lubricant Through

Submitted by HAL D. DRAPER, *Asso. Prof. of Chem., State Teachers' College, Fresno, Calif.*

Nordstrom's Perfection Is Your Protection

Submitted by RUSSELL EGBERT, *Box 433, Marcus Hook, Pa.*

Eighth to Twentieth Awards ($5.00 Each)

For Those Whose Goal Has Been Control
Submitted by ARTHUR ATKINS, *1055 Green St., San Francisco, Calif.*

Nordstrom's Lubricated Action Is the "Seal" of Satisfaction
Submitted by S. ST. CLAIRE, *308 Oakland Ave., Oakland, Calif.*

Bringing Pressure to Bear on Valve Troubles
Submitted by ALBERT S. EGGLETON, *781 Ocean Ave., Brooklyn, N. Y.*

Will Stand the Strain on Any Main
Submitted by FRED J. MAPLES, *Box 368, Morris, Okla., c/o O. N. G. Corp.*

Simple to Lubricate, Easy to Operate
Submitted by G. W. MARTINDALE, *2254 Whitney Ave., Niagara Falls, N. Y.*

They Lubricate As They Operate
Submitted by EDITH M. BELL, *1229 Boardwalk, Atlantic City, N. J.*

Loosened and Tightened by Lubricant
Submitted by L. D. NICOLSON, *1345—30th St., N. W., Washington, D. C.*

Where Nordstroms Go In Troubles Go Out
Submitted by E. J. SHAUNCE, *146 No. 79th St., Highland Park (Upper Darby), Pa.*

With Every Connection Comes Your Protection
Submitted by C. G. SCHRAM, *1322 S. Wabash Avenue, Chicago, Ill.*

Once Installed Never Stalled
Submitted by CHARLES W. SMITH, *3736—26th Ave. West, Vancouver, B. C.*

Made Their Way By the Way They're Made
Submitted by E. D. MURPHEY, *Box 487, West Tulsa Station, Tulsa, Okla.*

Satisfaction at Every Turn
Submitted by CLAIR WILKES, *Scio, Ore.*

★ **11,670**

Slogans entered in the contest recently conducted by the Merco Nordstrom Valve Company were carefully analyzed by the Jury of Awards. We take this opportunity to thank the many contestants for their contributions.

MERCO NORDSTROM VALVE CO.

SUBSIDIARY OF THE MERRILL COMPANY

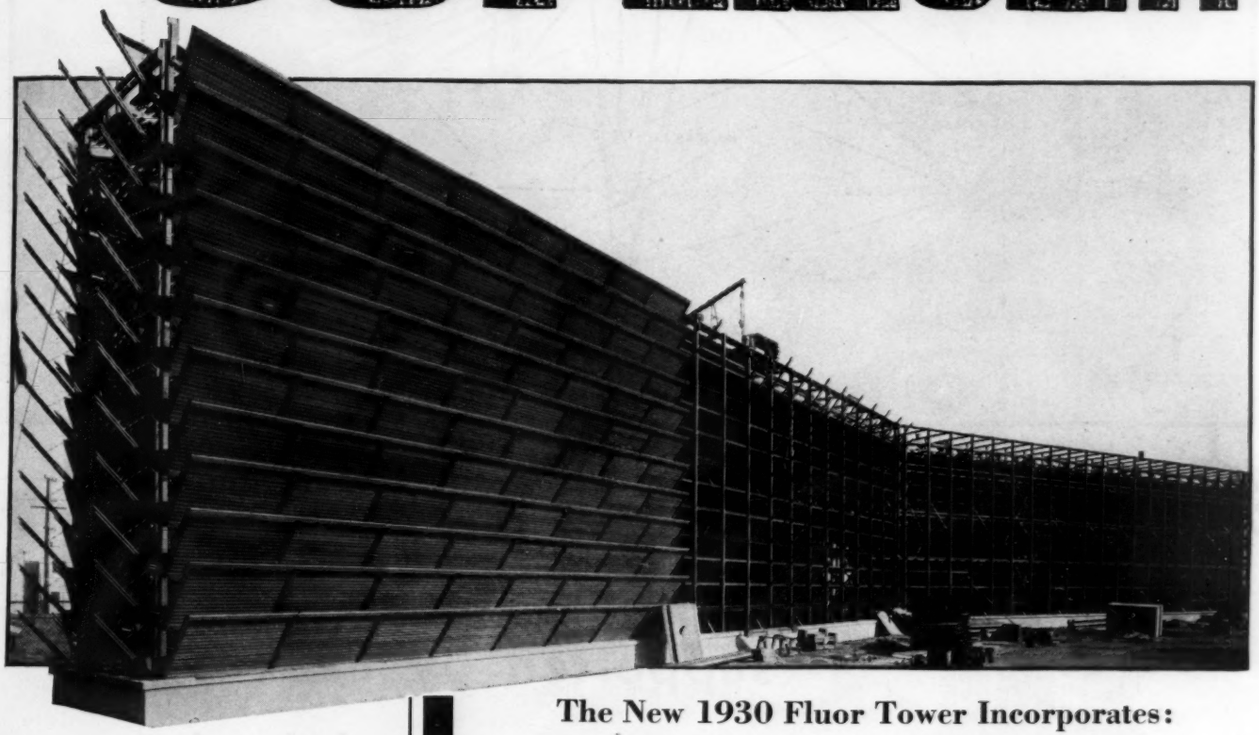
Engineers—Manufacturers

Atlanta—Healey Bldg.; Boston—184 Boylston St.; Buffalo—Genesee Bldg.; Chicago—176 W. Adams St.; Dallas—Magnolia Bldg.; Detroit—2842 W. Grand Blvd.; El Paso—111 S. Virginia St.; Houston—Petroleum Bldg.; Los Angeles—556 S. San Pedro St.; New Orleans—Masonic Temple Bldg.; New York—11 W. 42nd St.; Pittsburgh—Clark Bldg.; San Francisco—343 Sansome St.

Agencies in Principal Cities

Factories: Oakland, California and Belleville, New Jersey; Canadian Manufacturers—Peacock Bros., Ltd., Montreal, Cobalt, Winnipeg, Vancouver; England—Audley Engineering Co., Ltd., Newport, Shropshire; Buenos Aires, Argentine—General Electric, Soc. Anon., Victoria 618 Esq. Peru.

STRUCTURAL SUPERIORITY



The New 1930 Fluor Tower Incorporates:

(1) STRENGTH

(2) APPEARANCE

(3) FLEXIBILITY

(4) ERECTION FACILITY

Every post, brace, chord, deck, louver—in fact, all parts of the New Fluor Tower are interchangeable on any model. All parts are standard, and are stocked ready for shipment. Fast erection, ease of extension and mobility, result from simplicity of design.

Experience with 1500 Fluor installations has resulted in a great many new and distinctive improvements in the 1930 Fluor Tower.

An inquiry to our nearest office will bring you full particulars.

Los Angeles
March 16-23,
1930

BOOTH 99

THE Fluor CORPORATION, LTD.

(Successors to Fluor Construction Co.)

909 E. 59th St., Los Angeles, California

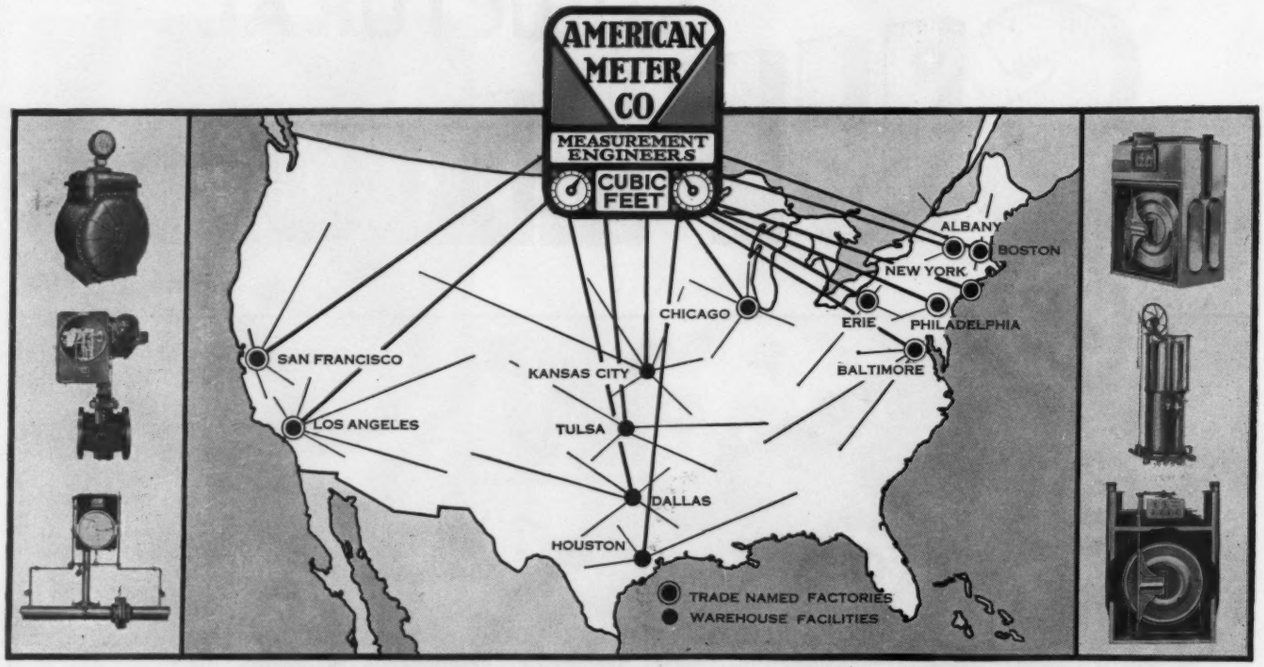
Tulsa, Okla. National Bank of Commerce Bldg.

New York, N. Y. 30 Church St.

Dallas, Texas Magnolia Bldg.

Houston, Texas 2nd National Bank Bldg.

March, 1930, Volume VI, Number 3, WESTERN GAS is published by Western Business Papers, Inc., at 124 West Fourth Street, Los Angeles, California. Subscription price (in advance) 20 cents the copy; $2.00 per year; 3 years $5.00; $3.00 per year foreign. Entered as second class matter June 1, 1925, at the postoffice at Los Angeles, California, under the Act of March 3, 1879.



Conveniently Located Factories

American Meter Company
New York
Established 1836

American Meter Company
Chicago
Established 1896

John J. Griffin & Company
Philadelphia
Established 1839

Helme & McIlhenny
Philadelphia
Established 1848

supported by nation-wide experience and facilities

Ninety-four years ago — shortly after the first gas plant was founded in this country — American Meter Company opened its first factory. Today American Meter Company supplies the gas industry from ten trade-named factories strategically located from coast to coast.

Each factory is an integral part of a comprehensive manufacturing organization, supervised by trained engineers. Each American Meter is made to the highest standards of accurate measurement and economical service.

Old Types Improved
New Types Developed

A pioneer in the manufacture of gas meters, American Meter Company is still pioneering in the development of improved gas measuring and testing apparatus.

With increasing experiment and intensive research, the engineers of American Meter Company are constantly improving established meters, and developing new equipment to meet new requirements.

Many Branches Provide Intensive Local Service

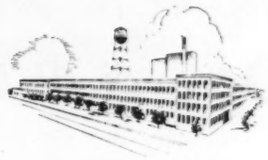
The geographical distribution of American Meter Company branches assures quick delivery and prompt engineering and shop service. It also permits an intensive knowledge of local conditions and their specific requirements.

Whenever you have a meter problem call in an American Meter Company representative. He will gladly bring to its solution a personal interest, supported by the experience of extensive laboratory experiment and of gas measurement practically applied in every part of the country.

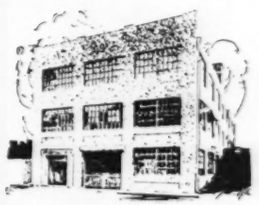
"Gas Measurement Engineering," a periodic publication of American Meter Company will be of interest to you—also the complete index to this Company's other printed information. We will be pleased to place your name on our mailing list.

D. McDonald & Company
Albany
Established 1855

Maryland Meter Works
Baltimore
Established 1866

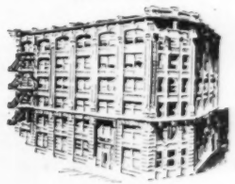


Metric Metal Works
Erie, Pa.
Established 1888



Pacific Meter Works
Los Angeles
Established 1901

Pacific Meter Works
San Francisco
Established 1901



Nathaniel Tufts Meter Works
Boston
Established 1860

AMERICAN METER CO
MEASUREMENT ENGINEERS
CUBIC FEET

AMERICAN METER COMPANY

Incorporated

General Offices: 105 West 40th Street, New York, New York . . . . Established 1836

THE WORLD'S LARGEST MANUFACTURERS OF GAS METERS AND ALLIED APPARATUS

SALES ALBANY · BALTIMORE · BOSTON · CHICAGO · DALLAS · DENVER · ERIE · KANSAS CITY
SERVICE LOS ANGELES · NEW YORK · PHILADELPHIA · PITTSBURGH · SAN FRANCISCO · TULSA

The first of a series of advertisements by the Oklahoma Contracting Company showing the history and the development of the pipe line industry.

A NATIVE RUNNER MADE THE FIRST PIPE LINE FROM A BAMBOO ROD

In Upper Burma, east of the Bay of Bengal, the bare feet of native carriers for numberless centuries have trod the paths between the shallow oil wells and the river. Oil is drawn from the ground by a pulley and goatskin bucket, where it is transferred to earthenware jars, and carried on the shoulders of the runners to the river. There, it is poured into the hold of the boat.

. . . . . Once there was a runner who grew weary of his load, who wondered if the crude oil might not be made to flow of its own gravity down to the river. From a hollow bamboo rod he made the first pipe line ever used for the transportation of petroleum. In theory it worked. In practice, it leaked at the joints. He gave up his dream, became a runner again, and his invention was buried under the dust of centuries. . . .

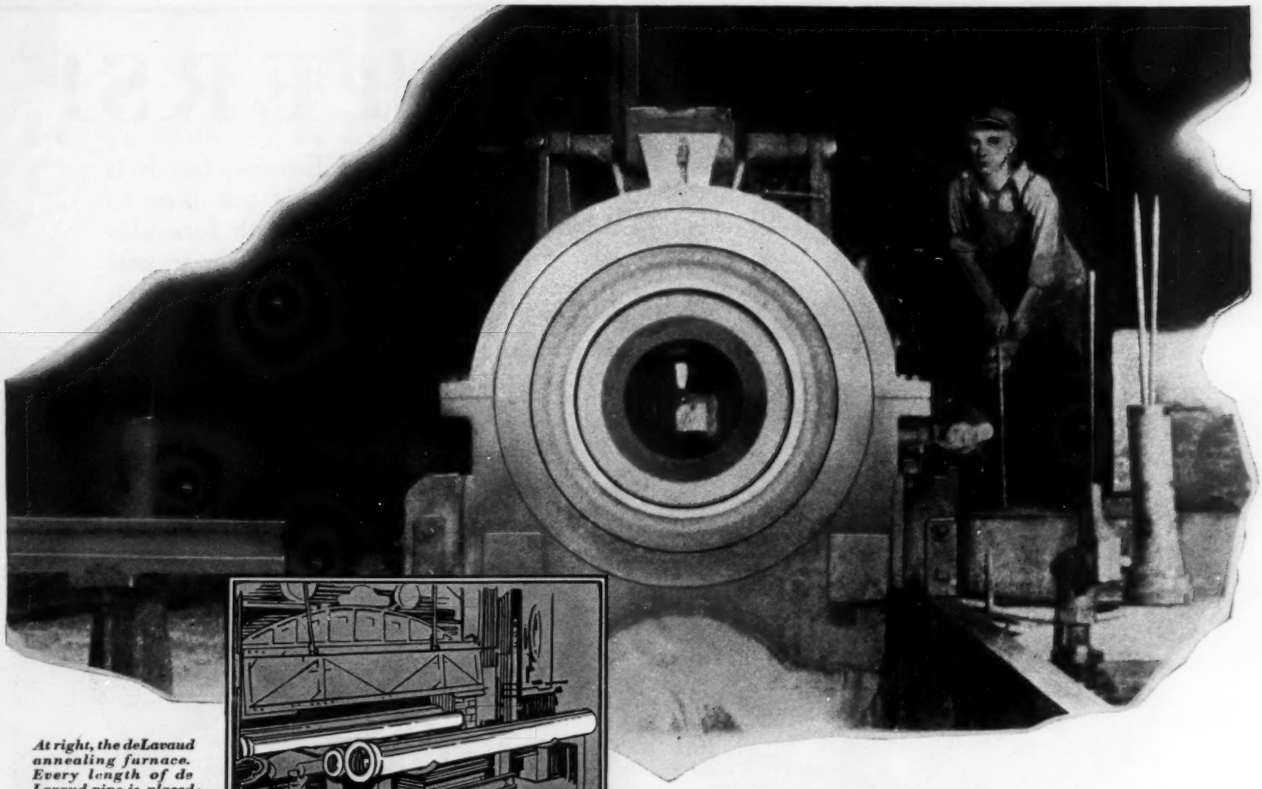
Although oil was produced in Asia hundreds of years before the Christian era, methods of petroleum transportation were very primitive and makeshift until 1865 when an American laid the first successful pipe line. Fields all over the world are today connected with seaport, railroad, refinery, and civilization by oil and gas pipe lines.

Lubbub Swamp on the Monroe-Atlanta Line

The Oklahoma Contracting Company laid the pipe from Yazoo City Miss., to Tuscaloosa, Ala.—approximately 200 miles—for the Southern Natural Gas Corporation's 22″ line from the gas fields of Monroe, La., to Atlanta.

The laying of this line through swamps, thickly wooded sections, and over mountains was one of the most difficult jobs in pipe line history. The work was carried on in the dead of winter, yet **all requirements for completion dates were fulfilled on the contract specified time.**

OKLAHOMA CONTRACTING COMPANY DALLAS TULSA



At right, the deLavaud annealing furnace. Every length of de Lavaud pipe is placed in such a furnace where controlled heat uniformly anneals the entire length.

Above is a deLavaud machine in action. The tilting ladle shown in the background holds the amount of iron to form one pipe.

Sturdy, Flexible deLavaud pipe is always uniform in thickness

No chance of deLavaud pipe being "sided." A physical law assures the uniform thickness of the pipe walls. deLavaud pipe is made by pouring molten iron into a rapidly revolving cylindrical metal mold. The revolving action holds the iron against the mold with a force which at all points is equal to 40 times the force of gravity.

Immediately after coming from the machines, every length of deLavaud pipe is annealed in an oven where temperatures are accurately controlled. This controlled annealing is responsible for the flexibility of the pipe metal. It is the reason why deLavaud pipe is free from casting strains and is so satisfactory to cut and tap.

And, when it comes to strength, exhaustive tests by authoritative laboratories have proved that deLavaud pipe will stand 25% more pressure than any other cast iron pipe of equal thickness.

deLavaud pipe is manufactured in accordance with U. S. government specifications. We are also making and furnishing this product in the various thicknesses and weights shown in the specifications of the American Water Works Association and the American Gas Association. Write for complete information.

United States Pipe and Foundry Co., Burlington, N.J.

Our pipe bears the "Q-Check" trademark of The Cast Iron Pipe Research Association

Sales Offices:
New York, Philadelphia, Pittsburgh, Cleveland, Buffalo, Chicago, Dallas, Birmingham, Kansas City, Minneapolis, Seattle, San Francisco, Los Angeles

THREE FIGHTERS!

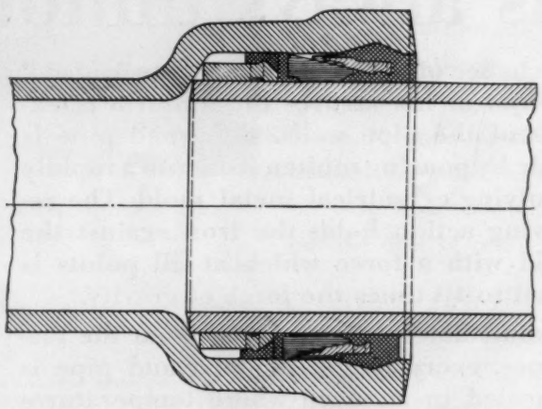
War ended in the trenches of Europe, but it is still on in the trenches where you lay gas pipe in America! Gas journals are still filled with formulas for the gas man who has not yet swung over to **cast iron pipe.** Panaceas for his pains, remedies for rust, lotions for leaks, occupy costly space. Nursing his mains is the whole note. But—

"Pacific" Cast Iron Pipe Needs No Coddling

McWane-Pacific CAST IRON gas pipe needs none of this. No wrapping, no coating, no coddling. It licks rust to a standstill; lasts by the century. No piece of CAST IRON pipe ever wore (or rusted) out in ordinary service. And you can get it now Western-made, at attractive prices. Sizes 1¼ through 12 inches.

McWane FLEXPAN Gas Joints

Fight unaccounted-for gas losses. Hold high-pressures perfectly. Expand and contract at will. Deflect 2″ under 100 pounds pressure without leak. Simple, permanent, economical. Drawing at right shows appearance (top) before calking; (bottom) after calking. Investigate this factory-made joint today.



WRITE FOR ILLUSTRATED LITERATURE

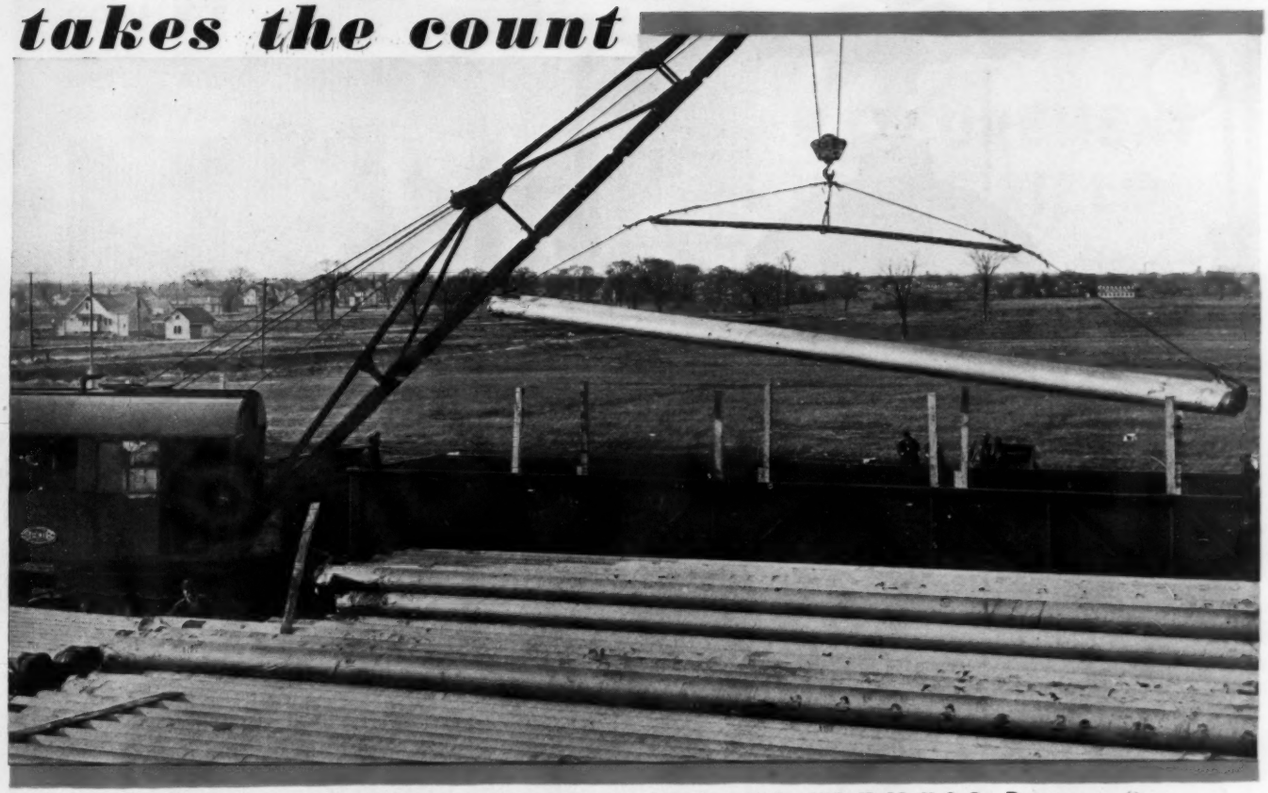
McWANE CAST IRON PIPE CO. Birmingham, Ala.
PACIFIC STATES CAST IRON PIPE CO. Provo, Utah.

Sales Offices in Principal Cities

111 Sutter St.....SAN FRANCISCO
Subway Terminal.....LOS ANGELES
326 F. N. B. Bldg.....DENVER
149 W. 2nd South St.....SALT LAKE
611 Spalding Bldg.....PORTLAND

McWANE
CAST IRON PIPE

CORROSION
takes the count

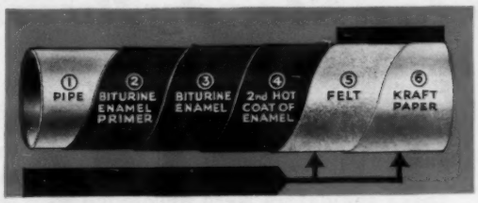


Loading pipe mechanically coated and wrapped at the mill by Hill, Hubbell & Co. Process

BEFORE a champion risks his title in the prize ring he puts in weeks and weeks of intensive training, armoring his body with a protective layer of solid muscle that is proof against the hardest wallops. Unprotected line pipe is nothing but a dub amateur to corrosion. Weak spots are soon found and the pipe is down and out — and so are the investor's profits.

It has taken many years of research to find a way to make corrosion take the count, but it has been found and his blows are no longer felt by operators who protect their pipe *before* they lay a single length in the ground. Hand-coating of pipe offers partial protection, but it is a slow, uncertain and expensive operation.

The only way to lick corrosion and do the job right is to buy *pipe that has already been coated and wrapped at the mill.* The mills listed later supply pipe that is mechanically coated and wrapped by the Hill, Hubbell & Company Process. Our plants are located near these mills and are equipped to handle their output. When you buy pipe from any of these mills you know that it is fully protected against corrosion, proof against acids, alkalis and all other detrimental forces. You know it is cleaned of rust and scale before the Biturine Enamel Primer is put on. The whole process is mechanical, involving no human element. The final coats of felt and kraft paper are wound on under high tension so that nothing can touch the protective coatings of Biturine. Such pipe will stand up for years and serve without a leak.



Felt and kraft wrapping are applied under tension

The Hill, Hubbell & Company plants are equipped to coat and wrap pipe up to 24-inch by the Hill, Hubbell & Company Process. We can make the number of machine-applied hot coatings and wrappings conform to any specifications covering a wide range of combinations and materials. Ask us about them.

Hill, Hubbell & Company coating and wrapping plants are located in the following cities, for the production of the pipe manufacturers listed.

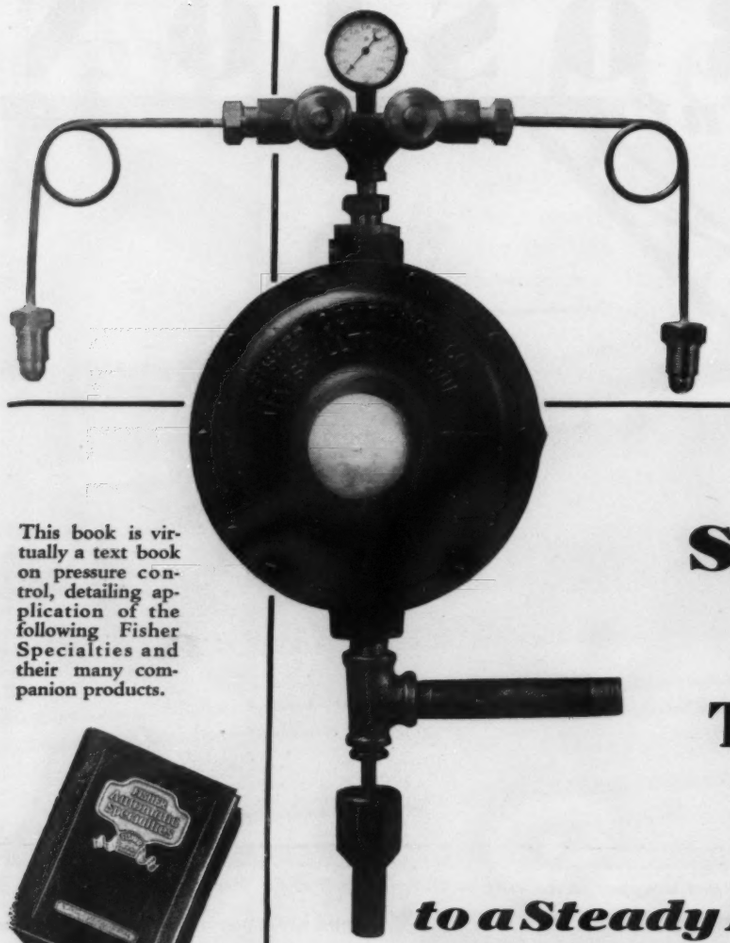
Central Tube Company	Ambridge, Pa.
Spang-Chalfant & Company	Ambridge, Pa.
Youngstown Sheet & Tube Company	Indiana Harbor, Ind.
Youngstown Sheet & Tube Company	Youngstown, Ohio
National Tube Company	Lorain, Ohio
A. O. Smith Corporation	Milwaukee, Wis.

BITURINE COATINGS

Biturine Enamel — Biturine Solution No. 5
Biturine Enamel Primer — Biturine 70-30
Biturine Coupling Mixture

Biturine Enamel and Primer are perfectly adapted to the Hill, Hubbell & Company Process of mechanically applying coating to the pipe at the mill.

GENERAL PAINT CORPORATION
HILL, HUBBELL & COMPANY DIVISION
PAINTS VARNISHES LACQUERS
Specialists in the science of protective coatings for industry
Chicago, New York, Tulsa, Houston, Dallas, San Francisco, Oakland, Los Angeles, Portland, Seattle, Spokane
Export Offices: 11 Broadway, New York, N. Y., U. S. A.
160 Fremont Street, San Francisco, Calif., U. S. A.



Safely, Surely Reducing Tanked Gas Pressures

to a Steady Burning Pressure

Fisher has designed, constructed, and perfected the No. 700 Series regulators for liquefied petroleum gas.

These regulators were developed to reduce 5 to 300 pounds initial pressures to 1 to 20 inches of water pressure as desired.

A special composition diaphragm was developed to "lick" the effects of the gas.

This diaphragm remains ultra-sensitive — holds burning pressure steady always — shuts off positively on dead end service.

But tests and experiments are now far behind — proven by two years' actual field service.

And Fisher Series 700 Liquefied Petroleum Gas Regulators are being adopted as standard with perfect assurance that they will meet their job perfectly.

Complete information, for which there is not space here, will be gladly furnished.

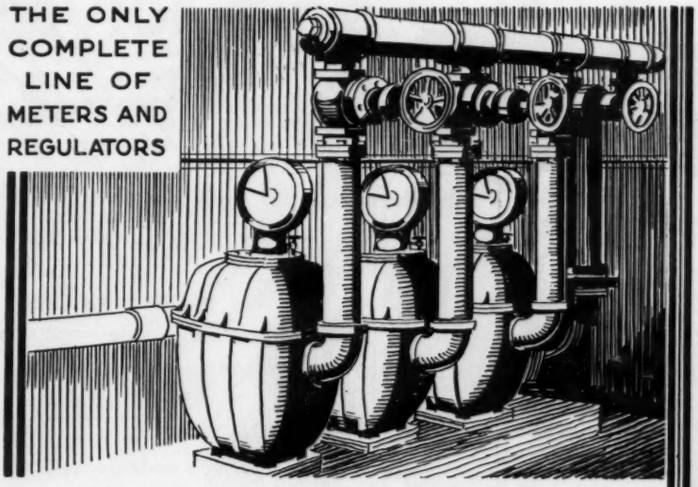
THE FISHER GOVERNOR CO., Inc.
2400 Fisher Building **Marshalltown, Iowa**

This book is virtually a text book on pressure control, detailing application of the following Fisher Specialties and their many companion products.

Steam Pump Governors
[10 to 10,000 lbs.]
Boiler Feed Pumps
Fuel Oil Pumps
Vacuum Pumps
Receiver Tank Pumps
Pump By-Pass Valves
electric and power driven pumps
Reducing Valves, Pressure Regulators
for all pressures—liquids, gases, steam
Differential Pressure Regulators
Vacuum Regulators
Strainers
pipe, suction and drip pocket
Liquid Level Controllers
direct and remote type
Lever Valves
air, gas, or liquid
Float Valves
Fluid Mixers
Hydraulically Operated Valves
Relief Valves
Back Pressure Valves
Steam Traps—Air Traps—
Gasoline Traps—Grease Traps
Exhaust Heads
Steam and Oil Separators
Drip Pockets
Vapor Pressure Controllers
for oil storage tanks
Boiler Gas Fuel Governors
Gas Engine Fuel Regulators
Automatic Gas Relief Valves
Gas Pressure Regulators
main and house service
Liquefied Petroleum Gas Regulators
for gas cylinders
Gas Water Traps

FISHER

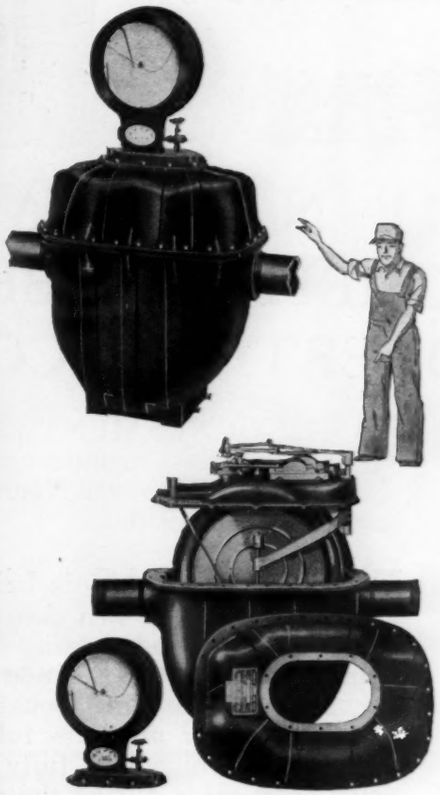
THE ONLY COMPLETE LINE OF METERS AND REGULATORS



FOR MEASUREMENT IN THE FIELD -EMCOS

EMCO large capacity meters with combined record gauges are particularly suited for measurement in the field.

All moving parts are mounted on one removable casting, the valve plate, making it easier to make repairs in the line. Rolling type diaphragm, patented tangent and valve movement, interchangeability of all parts, diaphragm drains, one piece case construction; all these are features that result in accurate measurement.



EMCO PRINCIPLES

One Piece Case Design · Rugged Beyond Compare
All Moving Parts on Removable Casting
All Parts Interchangeable
Rolling Type Diaphragm

EMCO METERS AND REGULATORS

PITTSBURGH EQUITABLE METER COMPANY

Main Office and Works—Pittsburgh, Pa.

New York City · Chicago, Ill. · Los Angeles, Calif. · Tulsa, Okla. · Dallas, Texas · Columbia, S. C. · Salt Lake City · Kansas City, Mo. · Seattle, Wash. · Houston, Texas

THE NATURAL GAS CONVENTION EXHIBIT WILL BE HELD THIS YEAR IN THE ADVERTISING COLUMNS OF WESTERN GAS

ANNOUNCEMENT has just been made by the American Gas Association that a manufacturers exhibit will *not* be held this year in conjunction with the Annual Natural Gas Convention which convenes in New Orleans May 5th, 1930.

WESTERN GAS is bringing the Convention Exhibit to the gas men and has completed plans to hold a comprehensive exhibit of appliances and equipment in the advertising columns of its May issue—which will be the 3rd Annual Natural Gas Edition. Exhibitors will plan their copy in the same manner, and with the same thought that they would give in arranging an exhibit—Displaying their products, fully illustrated, and giving the complete practical information which will fully acquaint the gas men of improvements and developments made during the past year.

Use one page of advertising for each booth—If last year your products necessitated the use of three booths to display your complete line—you should use three pages in the Natural Gas Edition of *Western Gas.*

In addition to the regular contents our editors are compiling three survey features which will make this edition a tribute to the gas industry.

All delegates attending the Convention will be provided a copy of this feature edition—this distribution will be in addition to the regular circulation of *Western Gas,* which is greater in the 22 western states than all of the other gas industry publications combined.

Wire collect the number of pages you will require—regular rates apply.

WESTERN GAS

124 West Fourth Street **Los Angeles, California**

Naylor Pipe "Unit Construction"
Saved This Oil Company $1,123.28 Per Mile

RECENTLY a prominent Oil Company laid a 12" Naylor Pipe line in uniform 40 foot lengths, Victaulic coupled.

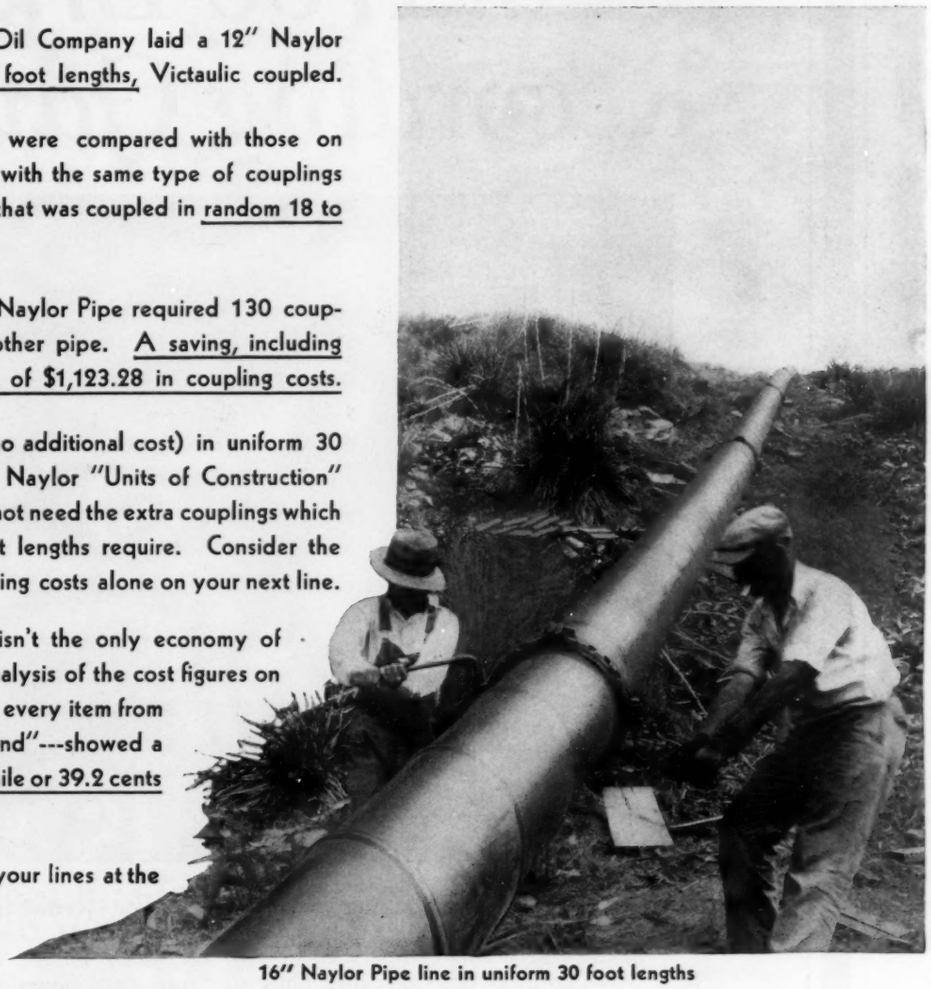
The cost figures on this line were compared with those on another line---also a 12" line with the same type of couplings but a different pipe and one that was coupled in random 18 to 22 foot lengths.

The comparison showed that Naylor Pipe required 130 couplings less per mile than the other pipe. A saving, including the freight on the couplings, of $1,123.28 in coupling costs.

Naylor Pipe is furnished (at no additional cost) in uniform 30 and 40 foot lengths. These Naylor "Units of Construction" mean fewer joints. You do not need the extra couplings which pipe in random 18 to 22 foot lengths require. Consider the saving you can make in coupling costs alone on your next line.

But reduced coupling costs isn't the only economy of Naylor Pipe. A complete analysis of the cost figures on the two 12" lines---reckoning every item from freight to "as laid in the ground"---showed a net saving of $2,064.74 per mile or 39.2 cents per foot.

Choose Naylor Pipe and lay your lines at the lowest cost per foot in the ground.



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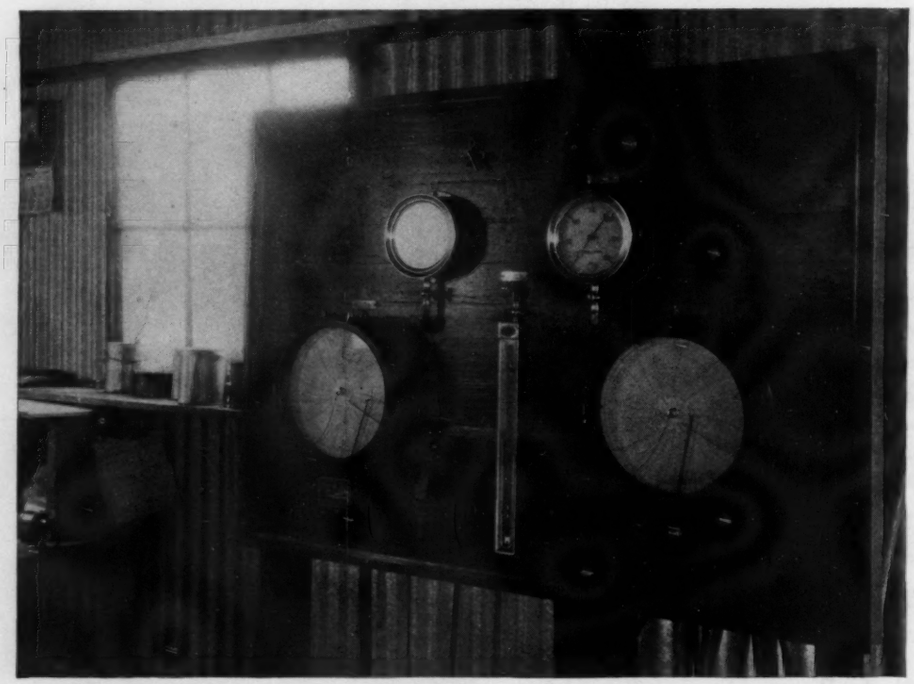

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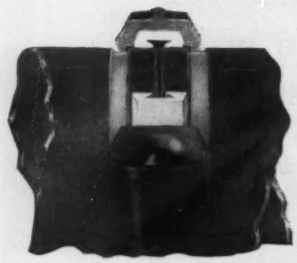

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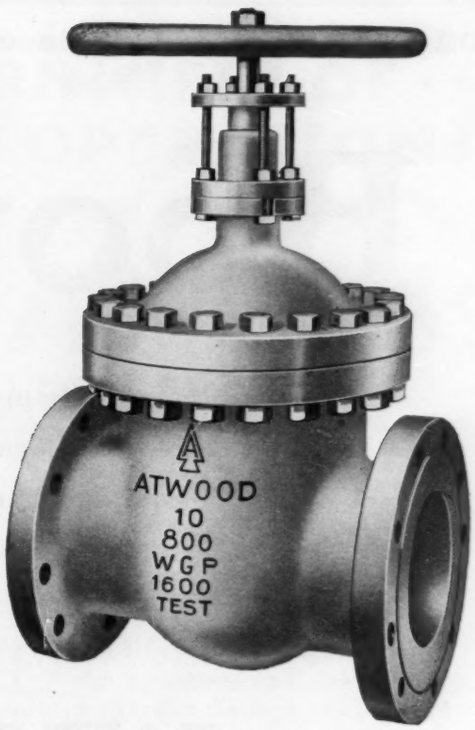

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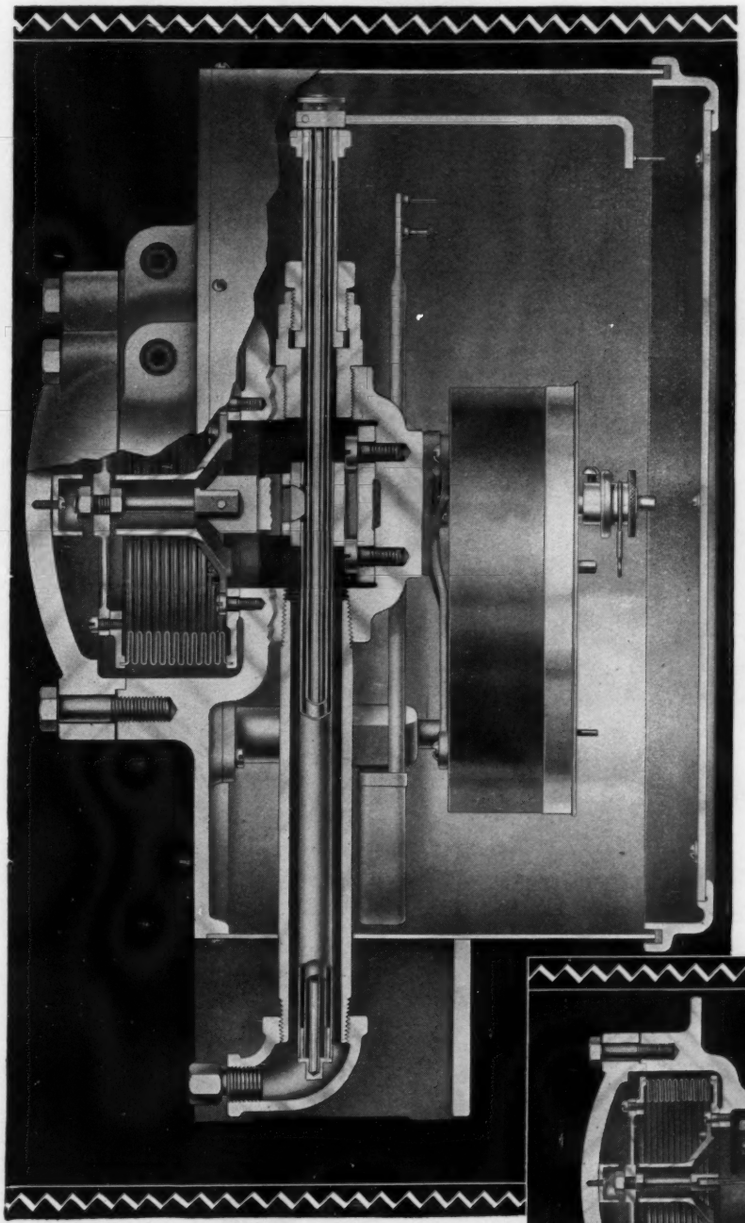

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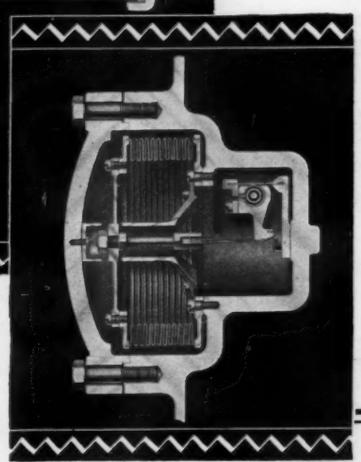

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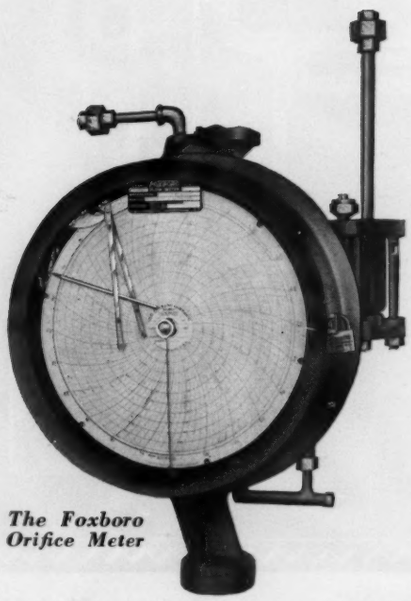

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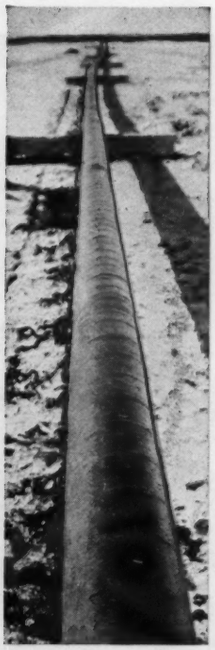

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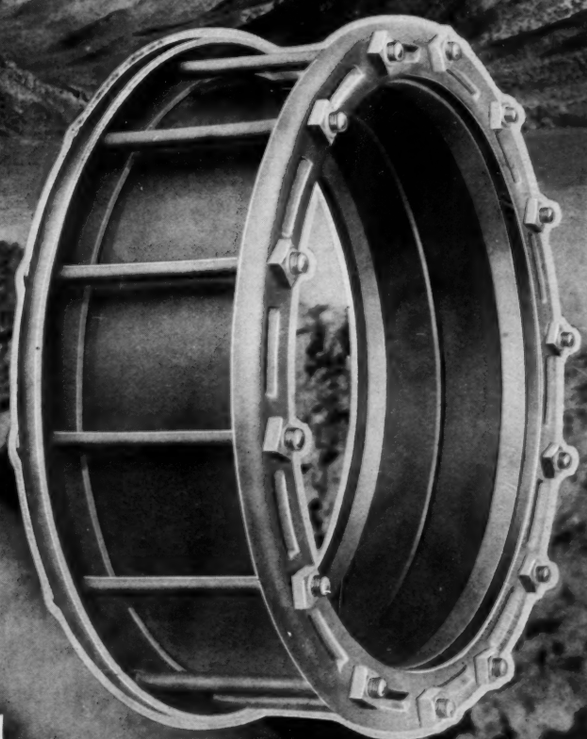

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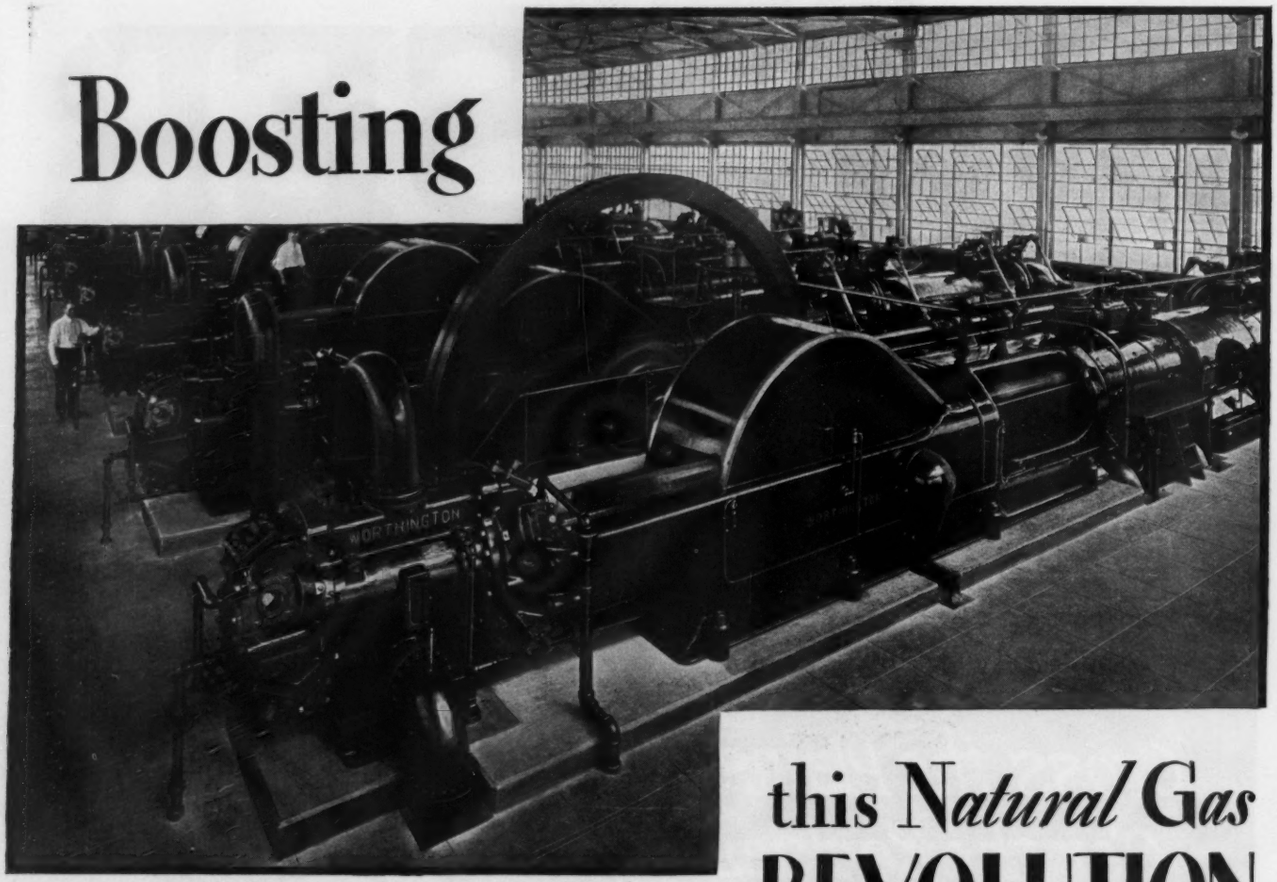

DeSiard Station, Interstate Natural Gas Company, Monroe, La., a typical installation of four Worthington 25"x48" Twin Tandem Gas-engine-driven Gas Compressors. Ford, Bacon & Davis, Engineers

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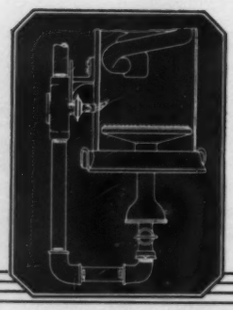

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Running *a* Soil Survey *on a* Large Distribution System

By GUY CORFIELD

Chief Chemist, Los Angeles Gas and Electric Corporation

THE gas distribution system of the Los Angeles Gas and Electric Corporation covers an area of some 200 square miles, comprising heavy-traffic city streets, industrial districts and residential subdivisions old and new. The nature of the soil varies widely and often suddenly throughout this area, as also does the ground moisture, and pipes that will last 30 years in one location will survive for less than three in another. Consequently it seems only logical to study the soil situation and provide a usable and permanent record of the same. It was seen that if a scheme of examination to determine and record the actual corrosiveness of the soil toward bare pipe could be consummated, it would be possible to predetermine the necessity for protection when laying or renewing pipe and also to predict the condition of old piping when conducting a leakage survey or renewal program.

Further, soil conditions would be known and available for consideration when investigation has shown us the relative merits of various pipe coverings in different types of soil. Given a certain expenditure for pipe protection, it could be more efficiently applied by protecting heavily in the bad spots and lightly in the good locations rather than by treating every area similarly. Such a soil test had to be cheap, rapid and reliable. We believe the procedure described below meets these requirements.

Procedure

A 1-quart sample of soil is taken in a friction top paint can, the sampling being done by the main and service crews who are instructed to turn in a can, properly labeled as to location, for every job they handle. The sample is taken at the depth of the main or service. Thus the entire area is gradually being covered.

Guy Corfield

The test piece used in a 4-inch length of ¾-inch mild steel standard screw pipe which has been sandblasted, numbered on one end, cleaned with benzol and weighed to the second decimal place in grams. A rubber stopper is inserted in the un-numbered end, projecting out ½-inch. This test piece is placed in a one-pint friction top paint can (with cover and top rim removed), the rubber stoppered end being downward and the rubber serving as an insulator. The soil is put through a coarse sieve (about 4 mesh) and mixed in a separate can with air-saturated distilled water. Sufficient water is added to bring about a condition *just below* saturation, so that liquid water does not settle out. This wet soil is filled into the test can around the nipple to the level of the top of the can. This immerses the nipple 3½ inches in wet soil. A 6-volt wet battery is connected across from the pipe to the can, the pipe being positive. This potential is left on exactly 24 hours and then the nipple removed, washed in water, scrubbed hard with a bristle brush and lightly with a wire brush, washed in alcohol, dried and weighed. The nipple is then coated with light oil and filed away for reference, together with a 1-ounce bottle of the soil.

Interpretation of Test

The loss in weight that the nipple suffers is considered as proportional to the maximum potential corrosiveness of the soil and is termed the *corrosion index number*. It varies with local soils from 0.10 grams to 13.00 grams and classifications have been arbitrarily set up as follows:

3.00 grams and over	*Very bad*
2.00 grams to 2.99 grams	*Bad*
1.00 grams to 1.99 grams	*Fair*
Less than 1.00 grams	*Good*

Colored pins, corresponding to these four classifications, are inserted in a large map hanging on the wall of the laboratory. Thus a graphic representation of the soil condition is provided, in addition to routine reports sent daily to all interested. When sufficient tests have been made it will be possible to construct a second map on which permanent colored areas replace the indications of the pins. This final map may also be modified by superimposing on it a map of average moisture conditions as obtained from topography and observation.

A second and very important indication given by the test nipple is the type of corrosion or pitting to be expected. This indication will be discussed later.

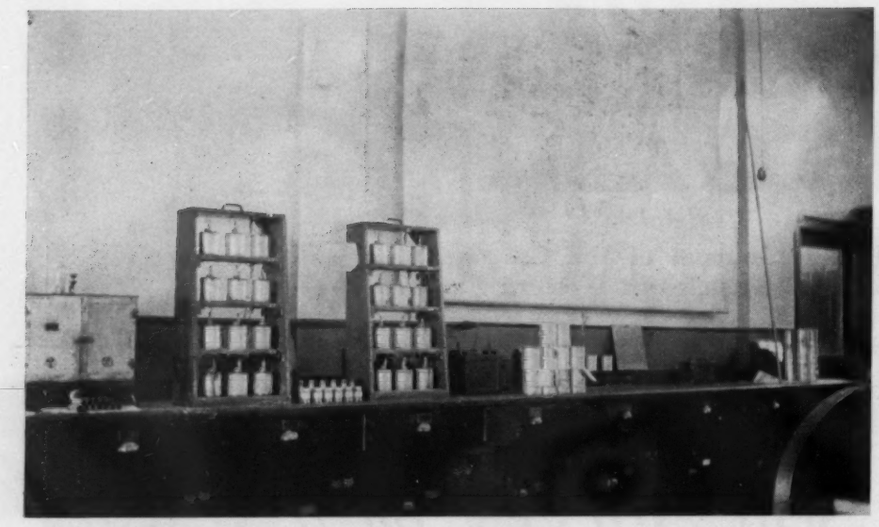


FIG. 1. Laboratory work bench with materials used in test on soil corrosiveness. Left to right: Pile of test nipples in front of electric oven; two test racks of 12 test cans each; between racks are six finished nipples and labeled soil samples ready for filing; next, a pile of sampling cans full of soil ready for test.

Comments on Test

Fig. 1 shows a photograph of a work bench in the laboratory. From left to right are seen a pile of test nipples in front of the electric oven, two test racks of 12 test cans each, between these racks six finished nipples and labeled soil samples ready for filing, and next a pile of sampling cans full of soil ready for test. Above the sampling cans can be seen the soil map.

Tests are run in racks of 12 test cans, each rack consisting of 4 removable shelves holding three cans each. These three cans are soldered to a wide copper strip screwed to the shelf and provided at the back with a lug for connection to the negative battery terminal. On the front edge of each shelf is a metal bar with three lugs, which lugs serve as positive terminals for wires (with clips on each end) leading to the nipples in the can on the shelf below. This positive bar also runs to and projects at the back of the rack to connect to the positive terminal of the battery. An automatic shut-off, actuated by a 24-hour gauge clock, is inserted in one of the battery leads and shuts off the current at the end of the 24-hour period. The error involved by leaving the nipples in the soil with the current shut off, even over night, is negligible. Thus tests may be set on Saturday, automatically shut off on Sunday and weighed on Monday, giving a 6-day week production.

Standard 6-volt automobile batteries are used; 36 tests per day can be run with six batteries, and these batteries kept in good condition with a 5-ampre "Tungar" charger.

By using 6 volts potential the loss in grams is large enough when compared to the weight of the nipple (about 160 grams), so that accuracy is not sacrificed by weighing only to the second decimal place.

The average rack of 12 tests takes current as follows:

Initial current	*2.0*	*amperes*
After 4 hours	*1.2*	*amperes*
After 8 hours	*0.9*	*amperes*
After 12 hours	*0.8*	*amperes*
After 16 hours	*0.75*	*amperes*
After 20 hours	*0.75*	*amperes*
After 24 hours	*0.75*	*amperes*

Considering a single test nipple, with an exposed area of 74 square centimeters, the average maximum current density would be 2 milliamperes per sq. cm., and the average current density after the first eight hours of test less than 1 milliampere per sq. cm. The tests in the rack are connected in parallel to the 6-volt source, so that the soils of higher corrosiveness take more current than those of lower corrosiveness. Single tests showing a loss in weight of slightly over 3 grams take a maximum (initial) current of 0.4 amperes. This would give a current density of 5.4 milliamperes per sq. cm. As anything over 3 grams is reported as *very bad,* regardless of degree, the latter current density can be considered as the maximum significant current density employed. In Technologic Paper No. 25 of the Bureau of Standards, entitled "Electrolytic Corrosion of Iron in Soils", discussing the current densities to be used in experimental work, appears the following:

". . . values were chosen of such magnitude as could give rise to considerable injury within a period varying from a few months to 15 or 20 years. For example, the highest value used was about 5 milliamperes per square centimeter, which under uniform distribution and at 100 per cent efficiency of corrosion would cause the corrosion to progress inward at the rate of about 5.7 centimeters per year, which corresponds to a rate rarely exceeded under practical conditions. The minimum current density used was 0.05 milliamperes per square centimeter, which

FIG. 2.

Pipe nipples which demonstrate different types of corrosion and pitting. Specimens are referred to by number in the author's discussion.

More than 5,000 soil samples have been tested by the Los Angeles Gas and Electric Corporation in establishing basic data on soil conditions throughout the company's distributing area.

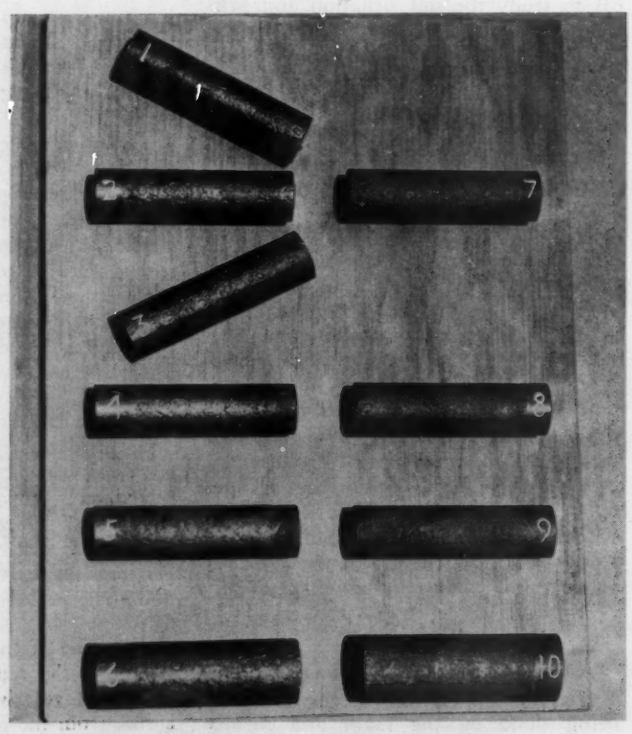


FIG. 3 (At Right)

A typical routine report summarizing all information obtained from 24 soil tests. The Index No. is the actual loss in weight (in grams) of each test nipple. The "pitting" column is interesting. It shows that while, in general, pitting varies in severity with the soil index, it does not necessarily occur with "Very Bad" soils (tests 4710 and 4698), or only slightly (test 4707). Also it may be severe in an otherwise mild or "Fair" soil (test 4699), which soil by ordinary tests would be considered relatively harmless. Pitting is, of course a very important indication.

Gas Works Laboratory. SOIL SURVEY TESTS *February 25, 1930.*

Test No.	District	Location	Index No.	Comments	
4707	Hawthorne	114th St., bet. Eucalyptus & Rosewood	7.99	Very Bad	SP.
4710	Belvedere	Estudillo St., Inter. of Lan Franco	4.10	Very Bad	.....
4698	S. Fasadena	1841 Hanscom Dr., bet. Illinois & South Ave.	3.90	Very Bad	.....
4704	Belvedere	Whittier Blvd., Inter. of Marietta	3 80	Very Bad	DP.
4690	L. A.	W. 81st St., bet. Cimarron & Van Ness	3.48	Very Bad	DP.
4705	Belvedere	Hollenbeck Ave., Inter. of Fresno	3.24	Very Bad	DP.
4694	Hyde Park	Victoria Ave., bet. Hyde Park Blvd. & 67th St.	2.58	Bad	MP.
4693	W. Adams	Wellington Rd. bet. 30th & 29th	2.47	Bad	MP.
4697	Alhambra	315 Winthrop Dr., bet. Poplar Blvd. & Commonwealth	2.35	Bad	.....
4695	L. A.	84th Pl., bet. Harvard & Denker	2.32	Bad	SP.
4711	Belvedere	Euclid Ave., Inter. of Atlantic St.	2.11	Bad	.....
4708	Belvedere	735 Camulos St. bet. Oregon & Whittier Blvd.	1.98	Fair	MP.
4696	L. A.	1647 Lucretia, bet. Delta & Effie	1.95	Fair	SP.
4692	L. A.	Soto St., bet. Medford & Alcazar	1.85	Fair	.....
4702	Belvedere	E. 6th St., Inter. of Euclid	1.64	Fair	SP.
4700	Watts	Graham, bet. P. E. Tracks & 107th St.	1.47	Fair	.....
4699	L. A.	W. 7th St, Inter. of Garland	1.45	Fair	DP.
4689	Hollywood	2045 De Mille Dr., bet. Los Feliz & Elmwood	1.08	Fair	.....
4712	Belvedere	Garnet St., Inter. of Rozelind	0.96	Good	.....
4709	Belvedere	E. 6th St., Inter. of Fickett	0.82	Good	.....
4701	Belvedere	1129 Calada St., bet. Hollenbeck & Atlantic	0.71	Good	.....
4691	Hollywood	8597 Franklin Ave., bet. Queens Ct. & Queens Rd.	0.56	Good	.....
4703	Hollywood	La Brea Ave., Inter. of Romaine	0.37	Good	.....
4706	Alhambra	205 N. Olive, bet. Maine & St. Charles Terrace	0.13	Good	.....

DP. Signifies Deep Pitting.
MP. Signifies Moderate Fitting.
SP. Signifies Slight Pitting.

Chemist

corresponds to a normal rate of corrosion of about 1 centimeter in 17 years. These extreme ranges represent therefore the limits between which the corrosion is of much practical importance."

From this quotation it is apparent that the current densities used in this soil survey work are within the practical range as found in actual field conditions and so can be expected to give results not distorted by excessive acceleration.

Moisture

Experimental tests with varying soils and moisture content disclosed the fact that as water was added to the soil the Corrosion Index Number increased proportionally up to a point where the soil was approximately *half* saturated (in terms of the visual saturation point where liquid water settles out). After this "half saturated" condition was passed the addition of water caused no increase in Corrosion Index Number, indicating presumably that all the soluble salts in the soil were in solution and fully ionized. Therefore it was considered that, by adding water up to the amount just below visual saturation, the maximum current carrying capacity of the soil would always be obtained.

Types of Corrosion and Pitting

It was soon observed that, regardless of degree, some nipples would be evenly and smoothly corroded while others would be pitted, and that the pits would be either deep, shallow, narrow or wide, or exhibit peculiar shapes such as large shallow circles with a raised portion in the center, or corrosion would sometimes be in the form of grooves or furrows. It was also noticed that the same soil caused the same type of corrosion each time, and investigation showed further that this would occur regardless of the kind of ferrous pipe nipple used.

Fig. 2 shows pipe nipples that demonstrate these observations. Nipples 1 to 6 have all been tested in the same soil, a 5 gram soil (Corrosion Index Number) which causes a wide shallow circular pit as large as ¼-inch in diameter with a raised portion in the center. Nipples 1, 2 and 3 are wrought iron (pipe material "A"), Nipple 4 mild steel (pipe material "B"), Nipple 5 copper bearing mild steel (pipe material "C") and Nipple 6, a different copper bearing mild steel (pipe material "D"). All suffered the same loss in weight (5 grams, to within a few tenths of a gram), and it will be observed that all exhibit exactly the same type of pitting. To test the influence of size of soil lumps, Nipple 1 was surrounded by through 10-mesh soil, Nipple 2 by through 4-mesh and on 10-mesh soil, and Nipple 3 by soil left on 4-mesh. All three nipples exhibited the same sized pits.

Now let us consider Nipples 7 to 10. They have all been tested in the same soil, a 4-gram soil which gives a very deep narrow "pinhole" pit. Nipple 7 is pipe material "A", Nipple 8 pipe material "B", Nipple 9 pipe material "C" and Nipple 10 pipe material "D". These four nipples also suffered the same loss in weight (4 grams plus or minus a few tenths of a gram) and show exactly the same type of pitting. This latter type of pitting is the exact opposite of the type caused by the 5 gram soil on the same kinds of pipe materials.

This brings out again the widely accepted generalization that *pitting is a function of the soil and not of the pipe material.*

Progress, Results and Expectations

More than 5,000 soil samples have now been tested, and the map is assuming an appearance such that areas in many districts can be definitely established. It has been found that the soil varies more often than was realized, necessitating careful and sometimes close sampling.

Tests have disclosed areas of danger that were formerly suspected and are now definitely recognized. New subdivisions are easily classified. Renewal programs have been assisted in that the desirability of protection is known and the probabilitly of deterioration indicated. Tests are verified by actual findings and experiences to a very gratifying degree of accuracy. Stray current electrolysis work is assisted when the soil is evaluated and can be looked upon with suspicion or otherwise.

It is believed that the soil map will be a valuable record, will entirely justify its cost and will fulfill the expectations that prompted its commencement.

Some Sales Methods *for* Use *and* Restaurant Conversion

By D. J. BARTELME
Hotel and Restaurant Sales
Pacific Gas and Electric Company

SELLING 550 B.t.u. manufactured gas for hotel and restaurant use, in close competition with other fuels, calls for sales engineering of the highest order. Mr. Bartelme in this discussion delivered before the Mid-Winter Commercial Section Conference of the Pacific Coast Gas Association, held at Los Angeles, February 6-7, reviews the methods followed by the Pacific Gas and Electric Company in putting on this load. Cost analysis, as a graphic method for making the prospect recognize the intangible charges he bears when using other fuels, is given a big place in the successful sales scheme.

D. J. Bartelme

Discussion following this paper developed a difference in sales practice between manufactured and natural gas utilities, explained by relative gas costs. Natural gas sales departments favored installing a maximum of gas burning equipment at the time of the change-over; while manufactured gas men felt that the course of wisdom is to install the minimum, until economies of gas are thoroughly recognized by the user, preventing return to former fuels.—*Editor.*

IN San Francisco in the past 12 months there were 21 conversions made from oil or coal fuel to gas, representing an annual consumption of 25,680,000 cubic feet and a revenue of $19,140. These included four clubs, five hospitals, one institution, two American-plan hotels, one large residence, one delicatessen, and the balance restaurants. Trials and tests were run at two of the hospitals and one of the clubs for a period of from 60 to 90 days, with no cost to the customer except for the fuel used. All three installations showed a saving to the consumer of from $20 to $50 per month in actual fuel costs, not including labor or items such as efficiency, cleanliness, dependability, and contented help. Naturally they were accepted upon completion of the trial and tests, and are still operating, and in two cases showing a much larger saving.

In fact, all conversion jobs made by the Pacific Gas and Electric Company in the San Francisco territory in the past two years are showing a saving to the consumer. This is due to the fact that a study is always made of the consumer's cooking requirements before an actual conversion is made and the minimum amount of equipment recommended that will satisfactorily handle the job. In other words, the gas company's business is selling gas, and not equipment, and after selling it, to keep it sold. This cannot be done if the consumer is loaded up with equipment, because if he is, he invariably uses it, thereby running up the bill, making a dissatisfied consumer and a logical prospect for our competitors.

On Table No. 1 is illustrated the plan used by the Pacific Gas and Electric Company in making up a cost analysis. In presenting a cost analysis, it can be divided into three parts; first, cost of the equipment; second, cost of operation of equipment, and third, the advantages of gas as a fuel.

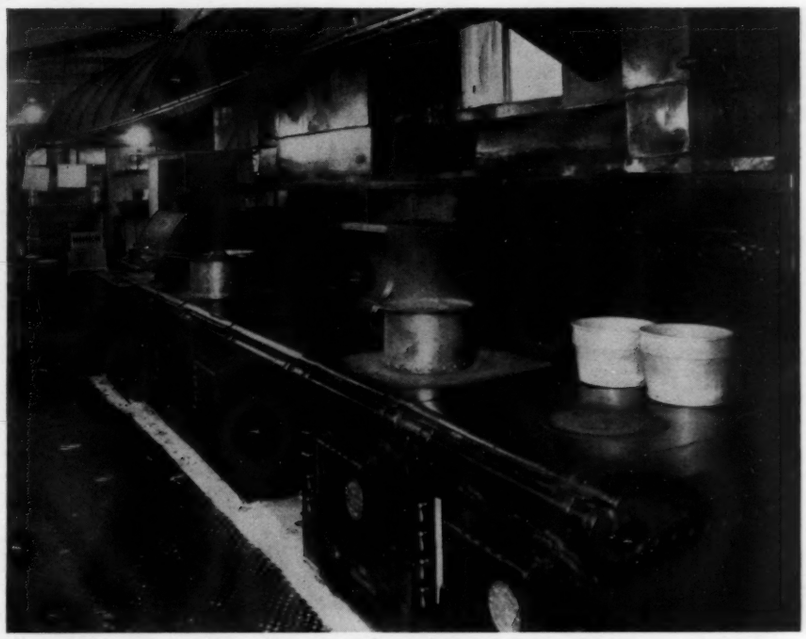
The following outline is suggested for obtaining information for a cost analysis so that all costs may be covered:

(1) Obtain cost of present fuels per month.
(2) Obtain cost of repairs on present range:
  (a) Ring tops.
  (b) Top plates.

FORM NO. 1. COST ANALYSIS OUTLINE

I. Cost of Equipment			
A. List price of competitive equipment, complete and installed	$.....		
B. List price of gas equipment, complete and installed	$.....		
C. Saving in dollars and cents in favor of gas	$.....		
II. Cost of Operating Ranges per Month			
A. *Fixed charges* (per month)		*Gas*	*Oil*
1. Depreciation on equipment	$.....		$.....
2. Interest 6 per cent on equipment	$.....		$.....
B. *Upkeep charges* (average per month)			
1. Cost of repairs on ranges	$.....		$.....
2. Cost of repairs on burner equipment	$.....	None	$.....
3. Cost of labor (renewing grate bars, fire brick and clay brick)	$.....	None	$.....
C. *Cost of fuel*			
1. Cost of competitive fuel in ranges per month			$.....
2. Cost of supplementary fuel to ranges (water and electricity)	$.....	None	$.....
3. Cost of gas fuel in ranges per mo. (*Note:* This estimate to be based upon following items a, b, c, d.)	$.....		
(a) Investigate the present gas load to obtain the applicable rate for additional gas consumption.			
(b) Estimate the number of hours ranges will be actually operated.			
(c) Show the hours of operation of range tops separate from ovens.			
(d) Use average index figures for estimating gas consumption.			
4. Cost of additional fuel in kitchen other than in ranges	$.....		$.....
D. *Total cost of operation*	$.....		$.....

on Hotel Prospects



A San Francisco club kitchen recently converted from oil to gas.

Suggested outline for obtaining information to be used on cost analysis (continued):

(c) Grate bars, brick and fire clay.
(d) Cleaning flue.
(e) Water backs.
(f) Labor.

(3) Obtain cost of burner maintenance if soil is used:
(a) Motor repairs.
(b) Pump repairs.
(c) Burner repairs.
(d) Labor.

(4) Obtain kind and cost of fuel supplementary to range:
(a) Cost of electricity for motor (or water) for oil burners.
(b) Hot water.
(c) Coffee urns.
(d) Steam tables.
(e) Plate warmers.
(f) Bake ovens.
(g) Broilers.

(5) Obtain number of hours ranges are used.

(6) Obtain number of hours ranges are actually performing work.

(7) Find out number of ovens that are used at same time.

(8) Obtain if possible number of meals per day.

The index figures shown in Form No. 2 are the figures used by the Pacific Gas and Electric Company in making up cost analyses. The index figure is the average hourly consumption, based on 550 B.t.u. manufactured gas.

Two actual cost analyses made up for jobs are shown with this discussion.

The first bill rendered (on club job—Cost Analysis No. 1) after the installation was in was for $178 or $8 more than oil. The second bill rendered was for $156, or a $14 saving. This club has been running on an average of $156 for the past six months, showing a saving of $14 per month. The club management would not allow for the engineer's time or the cost of running the motor for the oil pump or the cleaning of the flue, which showed on their books as follows:

Engineer's time—$155.25 per year or	$12.94	month
Cost of electricity for motor—$18 a year or	1.50	month
Cost of cleaning flues twice yearly at $6 each, or $12 per year or	1.00	month
	$15.44	month
Fuel saving, which is admitted	14.00	month
Total	$29.44	month

It is readily seen that if these charges were allowed, the saving as shown by their books would be over $29 per month.

Cost Analysis No. 2 was made up from figures received from the prospect, which is an American-plan hotel. The total cost of operation has been running at an average of $70 per month for almost a year, or a saving of $49 per month over oil and gas.

It is not always necessary to make up a cost analysis, but in cases where a consumer is under the impression that gas is expensive, it is always a good idea to bring to his mind costs that ordinarily he pays no attention to while using other fuels. This can best be done by a cost analysis as outlined above.

At the present time there are approximately 350 hotels and restaurants in San Francisco now using other fuels, that are potential prospects for gas. Of this number about 40 are using oil and the

FORM NO. 2. INDEX FIGURES USED IN MAKING UP COST ANALYSES

	Tops		*Ovens*	
Equipment	*Maximum cu. ft.*	*Index Fig. cu. ft.*	*Maximum cu. ft.*	*Index Fig. cu. ft.*
(1) Front Fired Sectional Range Per Section	135	95	75	55
(2) Center Fired Sectional Range Per Section	106	75	80	55
(3) Fry Top Sectional Range Three Tubular Burners	90	65	75	55
(4) Open Top Sectional Range 6 Giant Star Burners	174	120	75	55
(5) French Range Two Oven	270	190		
(6) French Range Three Oven	360	250		

COST ANALYSIS NO. 1 FOR CLUB

2 oil ranges using 40 bbls. per month at $1.24 per bbl.	$ 50.00
Repairs on oil ranges per month	45.00
Present gas bill (85,000 cu. ft.)	75.00
Total per month for operating present equipment	$170.00

Gas Range Tops

2 tops 6 a.m. to 9 a.m.—3 hrs. at 90 cu. ft. per hr. per top	540 cu. ft.
3 tops 9 a.m. to 1 p.m.—4 hrs. at 90 cu. ft. per hr. per top	1,080 cu. ft.
1 top 1 p.m. to 2 p.m.—1 hr. at 90 cu. ft. per hr. per top	90 cu. ft.
2 tops 4 p.m. to 8 p.m.—4 hrs. at 90 cu. ft. per hr. per top	720 cu. ft.
Estimated gas consumption for tops per day	2,430 cu. ft.

Gas Range Ovens

1 oven 6 a.m. to 9 a.m.—3 hrs. at 75 cu. ft. per hr. per oven	225 cu. ft.
2 ovens 9 a.m. to 1 p.m.—4 hrs. at 75 cu. ft. per hr. per oven	600 cu. ft.
2 ovens 4 p.m. to 8 p.m.—4 hrs. at 75 cu. ft. per hr. per oven	600 cu. ft.
Estimated gas consumption for ovens per day	1,425 cu. ft.

Open Gas Burners

2 burners 10 a.m. to 11 a.m.—1 hr. at 40 cu. ft. per burner	80 cu. ft.
2 burners 5 p.m. to 6 p.m.—1 hr. at 40 cu. ft. per burner	80 cu. ft.
Estimated gas consumption for open burners per day	160 cu. ft.
Total for gas tops per day	2,430 cu. ft.
Total for ovens per day	1,425 cu. ft.
Total for open burners per day	160 cu. ft.
Total for all gas equipment per day	4,015 cu. ft.
Total for all gas equipment for 30 days	120,450 cu. ft.
Estimated gas consumption for an all-gas kitchen per month	120,450 cu. ft.
Present gas consumption per month	85,000 cu. ft.
	205,450 cu. ft.

San Francisco gas rate to apply:

First 10,000 cu. ft. per meter per month 90c per M	$ 9.00
Next 20,000 cu. ft. per meter per month 79c per M	15.80
Next 40,000 cu. ft. per meter per month 73c per M	29.20
Next 80,000 cu. ft. per meter per month 68c per M	54.40
Remaining 55,000 cu. ft. per meter per month, 63c per M	34.65
	$143.05
10 per cent added for safety factor	14.30
	$157.35
Present cost of operating an oil and gas kitchen	$170.00
Estimated cost of operating an all-gas kitchen	157.35
Difference in favor of an all-gas kitchen	$ 12.65

COST ANALYSIS NO. 2—FOR HOTEL

Estimate of Gas Consumption for 3 section range

1 oven 6:30 a.m. to 8:00 a.m.—1½ hrs. at 75 cu. ft. per hr. per oven	110 cu. ft.
3 ovens 8:00 a.m. to 11:30 a.m.—3½ hrs. at 75 cu. ft. per hr. per oven	790 cu. ft.
3 ovens 4:00 p.m. to 5:30 p.m.—1½ hrs. at 75 cu. ft. per hr. per oven	340 cu. ft.
Total oven consumption	1,240 cu. ft.
2 tops 6:00 a.m. to 8:00 a.m.—2 hrs. at 90 c.f. per hr. per top	360 cu. ft.
3 tops 8:00 a.m. to 1:00 p.m.—5 hrs. at 90 c.f. per hr. per top	1,350 cu. ft.
3 tops 4:00 p.m. to 7:30 p.m.—3½ hrs. at 90 c.f. per hr. per top	945 cu. ft.
Total Top Consumption	2,655 cu. ft.
Total daily consumption for tops and ovens	3,895 cu. ft.
Total monthly consumption for tops and ovens	116,850 cu. ft.
Present average gas consumption per month	49,400 cu. ft.
Estimated consumption of ranges per month	116,850 cu. ft.
Total estimated gas consumption per month	166,250 cu. ft.

166,250 cu. ft. of gas at $.767 per thousand = $127.50 per month.

Estimate of Present Oil Consumption of Ranges

6:00 a.m. to 1:30 p.m.—7½ hrs. at 4 gals. oil per hour	30 gals. per day
4:00 p.m. to 7:30 p.m.—3½ hrs. at 4 gals. oil per hour	14 gals. per day
Total daily oil consumption	44 gals.
Total monthly oil consumption	1,320 gals.

1,320 gallons oil at 3c per gallon (or $1.24 per barrel) = $39.60 per month.

Estimated cost of electric current necessary to pump oil from tank to range	$ 8.00 per month
Cost of repairs to oil ranges	30.00 per month
Present average gas bill	41.42 per month
Total estimated cost of present operation	$119.02 per month

Estimated difference in cost—$8.49 per month in favor of oil and gas.

balance coal. These will average about 80,000 cubic feet per month or $60 in revenue—an annual consumption of 336,000,000 cubic feet with an annual revenue of $252,000. This will give some idea of the desirability of this business to the gas company.

SALES PLAN

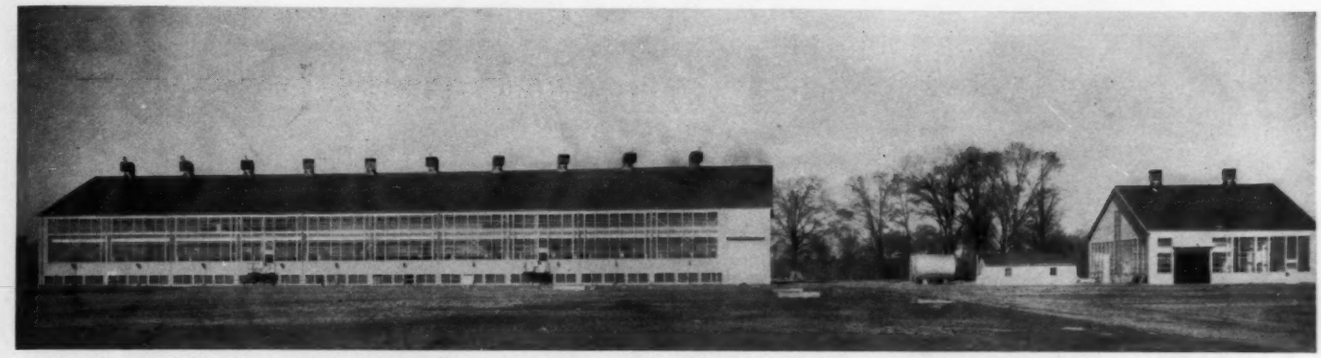
The Pacific Gas and Electric Company, realizing what a large field there is in this business, and at the same time considering that the prospect must have some inducement in order to get him to change in the shortest possible time, has adopted the following sales plan: The company will take out the old equipment and install the new gas equipment ready for operation, running all necessary lines, etc., charging the consumer the cash list price of the equipment only, and taking the old equipment to cover installation costs. In cases where the consumer's credit has been established, the company will sell the equipment on the following terms: Ten per cent cash payment on the signing of the order and the balance in 36 equal monthly payments without interest. This plan has been in operation for the past year and has proven very satisfactory.

The average cost of the installations runs between $50 and $150, which is a very nominal amount to spend for this business, considering that in the majority of cases it remains on the lines for years.

The above information refers only to the business of heavy duty range conversions, but these often lead to the consumer's using gas for other purposes, such as steam tables, water heaters, and broilers. These items should not be overlooked by the gas companies, because they are means of adding load to the companies' lines, and in most cases saving money for the consumer, thereby making a friend and a booster for gas. An example is the case of a steam table in the Fielding Hotel of San Francisco. After the coal range was replaced here, gas burners were installed under the steam table at a very small cost, and the hotel is now able to shut down the steam boiler for about four hours a day, which means a large saving to the consumer.

As an example of water heating, at the time the question of changing the coal ranges to gas came up at the College of Notre Dame, the prospective consumer immediately mentioned the fact that a water back was in use for preheating water. (The Pacific Gas and Electric Company does not recommend water backs in gas ranges, due to the trouble that may arise and also be-

(Continued on Page 52)



Main compressor building and auxiliary engine building at the Munce Compressor Station of the Arkansas-Louisiana Pipe Line Company, which company transmits gas for distribution by Arkansas Natural Gas Corporation. This gas engine driven compressor plant, said to be the world's largest, is located near Sterlington, Louisiana, and was completed late in 1929.

Largest Compressor Plant Begins Service *in* Louisiana

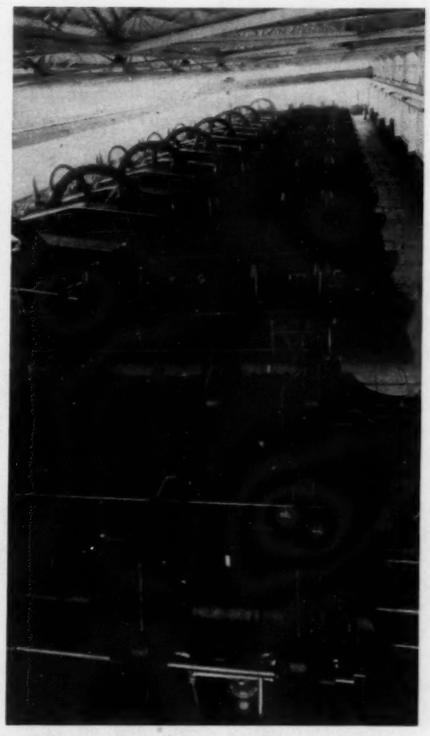
By W. E. NESTOR

Superintendent of Compressor Stations, Arkansas Natural Gas Company

MUNCE Compressor Station, named in honor of J. R. Munce, vice-president of the Arkansas Natural Gas Corporation, is located on the east side of the picturesque Ouachita River, one mile west of Sterlington, Louisiana, at an elevation of 87 feet above sea level. It has the distinction of being the largest gas engine driven compressor station in the world. The main building, which is of steel and concrete construction throughout, is 68 feet wide and 275 feet long, and is equipped with chain operated steel rolling doors; chain operated continuous steel ventilating sash, Swartout roof ventilators, and two 15-ton traveling cranes, each capable of handling the largest and heaviest engine parts in the building.

The compressor equipment in this building consists of ten 21½-inch by 36-inch twin tandem double acting Cooper gas engines directly connected to 13½-inch double acting Cooper gas compressors. Each of these units is rated at 1000 compressor brake horse power at 125 R.P.M.

Two 20-inch intake headers receiving gas from the metering station, supply the compressors. These headers are subdivided in a manner that makes them in reality constitute three separate headers. By a system of gate valves, this arrangement enables the operators to separate the incoming gas from the metering station under various pressures and use one or more compressor units to pump from each header, or all 10 units on one, or all three headers at one time, as necessity requires.



Housed in the main building at the Munce Station is a battery of ten 21½-inch by 36-inch twin tandem double acting Cooper gas engines direct connected to 13½-inch Cooper gas compressors—each unit rated at 1000 compressor brake horsepower at 125 R.P.M.

Discharge gas from the compressors is delivered through 10 independent discharge lines to a 10-section bent tube gas cooler, from whence it is delivered into the company's 20-inch Shreveport line or to the 16-inch El Dorado line, or to both lines at one time, as required.

The auxiliary building, which is similar in construction to the main building, is 60 feet wide and 52 feet long and is subdivided into engine room, machine shop, store room, and plant superintendent's office.

The auxiliary engine room contains two 250-horse power four cylinder Cooper vertical gas engines, directly connected to 175 K.W. 440 volt 60 cycle generators with direct connected exciters; switchboard, containing power; lighting, and ignition panels, instruments and synchronizing equipment, two 2500-G. P. M. motor driven centrifugal water pumps, two 50-G. P. M. motor driven centrifugal hot water circulating pumps for heating the buildings, one 60-gallon DeLaval motor driven separator for purifying lubricating oil, and two 60-cu. ft. Ingersoll-Rand direct connected vertical air compressors.

Machine shop equipment consists of one 26-inch by 18-foot lathe for machining pistons and other large engine parts, one 16-inch by 8-foot lathe for machining exhaust valves and other small en-

(Continued on Page 62)

Gas Solves *the* Boiler Fuel Problem *for a* Modern Hospital

By C. W. GALE

Superintendent Commercial and Industrial Gas Division, Public Service Company of Colorado.

THAT natural gas is the best fuel for large boilers, operated at high ratings, has again been proven by the recent installation of gas at the National Jewish Hospital at Denver, Colorado. This large institution is one of the finest in the West and is noted for its capable management, expert medical staff and modern equipment. The institution covers an area of approximately three city blocks and consists of 17 individual buildings. These buildings are all inter-connected by underground tunnels through which pipes carry the steam from the boiler plant to serve building requirements. Some of these tunnels are large enough to be used as subways for pedestrian travel between buildings. One very large tunnel under Colorado Boulevard serves as the subway for pedestrians, wheel chairs and hospital wagons between buildings, while the traffic of the boulevard goes on overhead.

The radiation load in the buildings described is equivalent to approximately 70,000 square feet of cast iron radiation when adding pipe exposure and heat conducted into the ground from the tunnels. In addition, the steam requirements of a modern laundry, steam driven refrigeration machinery, water heating, kitchen cookers and hospital sterilizer equipment are supplied from this system.

The boiler plant consists of two 315 horsepower water tube boilers of the cross drum type with horizontally inclined tubes. Each of these boilers is equipped with a chain grate stoker with an ash conveyor at the bottom of the stoker incline. A complete system of automatic coal handling from bins to stoker was in use. Coal was dumped through a grating in the drive, from whence it was elevated to the hoppers above the boilers. Coal from these hoppers was fed by gravity to the magazines on the stokers, thus keeping them filled without labor and with a minimum of attendance. Notwithstanding these advantages, use of coal was very unsatisfactory. The quality of coal was found to vary considerably, which required regulation of stoker feed and air for combustion. The type of stoker used depended on natural draft for introduction of air for combustion. Regulation under changing load and for varying quality of coal was very difficult, since it was accomplished by hand regulation of dampers. A steam pressure regulator was used in connection with the engine driving the stoker conveyor. This provided an automatic means of changing rate of feeding the coal, but automatic change of combustion conditions was not obtained. Although a reinforced concrete stack 42 inches in diameter by 150 feet high was used, insufficient stack effect was present to obtain more than 140 per cent of boiler rating with stoker as operated under each boiler unit.

The steam requirements in cold weather frequently demanded an evaporation equivalent of 600 to 700 boiler horsepower per hour. One boiler at 140 per cent of rating (an evaporation equivalent to 441 boiler horsepower) was far too small to take care of such a load. Under these conditions, and even under conditions less severe, it was necessary to cut in both boilers to carry the load.

Since boilers must be flushed and cleaned periodically this became a nuisance, as one boiler would not carry the usual winter load and mild weather had to be anticipated before it was safe to shut down one boiler for cleaning.

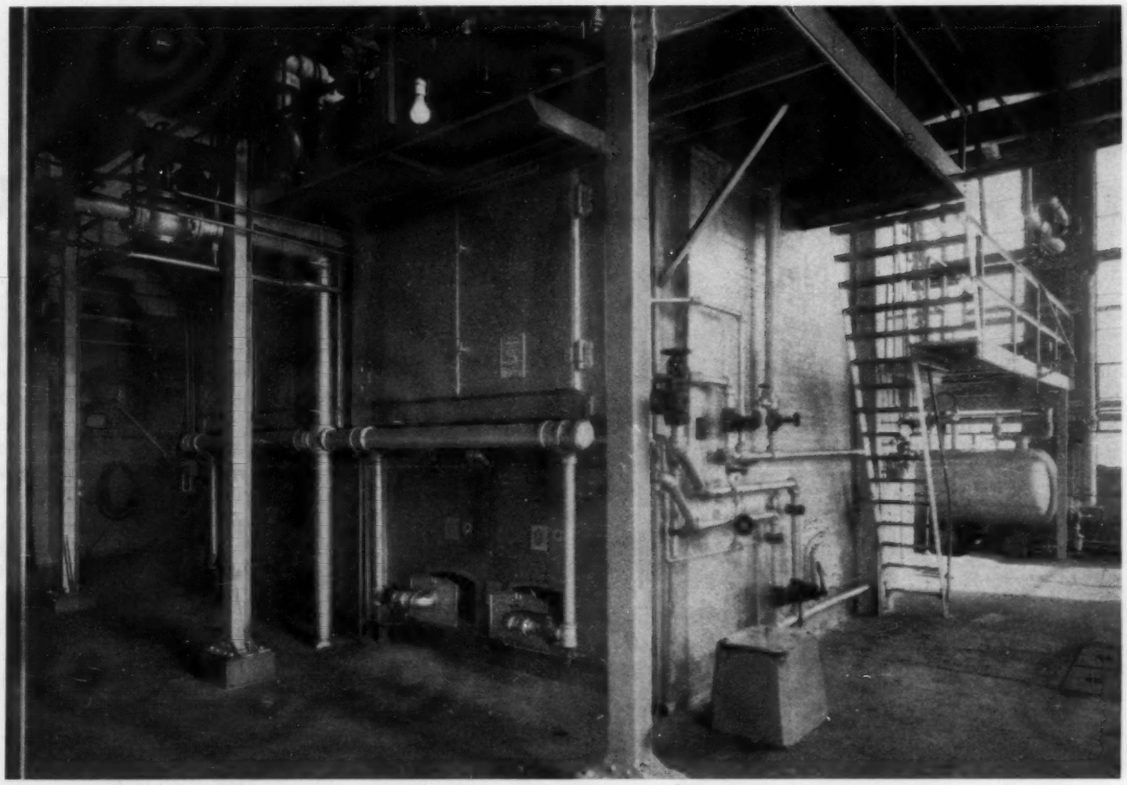
Furthermore, on account of the difficulty with stokers and combustion conditions it was necessary to use a very good grade of coal at a somewhat higher price than the average of other Denver plants. This was a factor aiding in the final economic comparison between coal and gas.

The boiler plant of this hospital was located within three blocks of one of our 20-inch intermediate pressure mains, which made it very fortunately situated with regard to gas service facilities. Work was begun selling the gas idea to the management of the hospital. They were interested but skeptical, especially since natural gas had been available in Denver only a few months. We proposed a complete change to gas on both boilers by removing the stokers, altering the combustion chambers, changing the method of baffling, and installing Webster gas burners capable of producing 200 per cent of rating on each boiler. On account of the contingency clause in our industrial contract it was necessary to include in our recommendation complete oil burning equipment for "standby" use. The equipment proposed was a duplicate oil pumping set with double preheater complete with 10,000 gallon oil storage tank and proper burner nozzles for steam atomization.

Our efforts on this sale progressed to a point where we were invited to present our proposal before a formal meeting of the hospital board of directors. At this meeting we stressed the advantages of gas, particularly bringing out the advantages of automatic steam pressure regulation and assuring them of 200 per cent of rating from each boiler when gas fired. Naturally we had to show them our figures on comparative coal and gas costs. They burned, during the previous year (1928), 3673 tons of lignite steam coal at an average price of $3.85 per ton delivered. This coal runs about 9,000 B.t.u. per pound as

C. W. Gale

IN describing the conversion of boilers at the National Jewish Hospital, Denver, Colorado, to gas fuel, Mr. Gale gives *Western Gas* readers not only an interesting discussion of one highly successful installation, but also sets forth the factors which make any boiler installation a satisfactory job. It is particularly stressed that proper design of combustion chambers and baffles in tube passages, plus correct burner application, should be held constantly in mind for each gas-fired boiler installation, no matter how favorable the competitive fuel conditions may be to gas.—*EDITOR.*



Two 315-h.p. water tube boilers at the National Jewish Hospital, Denver, Colorado, on the mains of the Public Service Company, Colorado, showing installation of Webster radiant gas burners.

received. Natural gas in Denver averages about 826 B.t.u. per cubic foot, due to the expansion of the gas under our reduced barometric pressure (12.14 pounds per square inch). It was estimated that 16,000 cubic feet of gas would replace each ton of coal previously burned, using 50 per cent as the probable average efficiency of coal as burned and figuring 70 per cent efficiency with gas. It was calculated that 10 per cent of this betterment with gas fuel could be obtained in the combustion chamber, the other 10 per cent by changing the baffling of the boilers. It was estimated that 3673 tons of coal previously burned could be replaced by approximately 60 million cubic feet of gas per year. This amount of gas purchased on the Denver industrial rate would earn an average rate of about 20c per 1,000 cubic feet. Applying the average rate to the 18,000 cubic feet required to replace each ton of coal gives the figure of $3.20 as the equivalent cost of gas. Since coal cost an average of $3.85 per ton, a saving of 65c per ton was estimated. This would amount to a total saving of $2387 per year on fuel alone. In addition it was conceded that $1800 per year boiler room attendance, $750 per year maintenance of stokers and $240 per year ash removal could be saved. This brings the total estimated savings up to $5177 per year and does not include such intangibles as cleaning, painting, power required to drive stoker engines, operation of coal elevator and savings in repair work on refractories in combustion chambers. Nor does it take into consideration the value of having a clean, flexible fuel capable of producing high ratings on the boilers.

This proposed saving was attractive to the management of the hospital, especially since the entire change to gas, including rebuilding combustion chambers, special apron type baffles, gas burners, automatic steam pressure regulators and complete oil burning standby equipment, could be had for approximately $10,000. The savings would pay this sum back in two years, besides doing away with a condition which was a nuisance with unreliable coal.

RIGHT DESIGN ESSENTIAL

The contract was closed and the installation made during July, 1929. The photograph of the boiler room gives a good idea of the simplicity and neatness of a gas installation when properly completed. The oil pump set for "stand-by" use is located in the main boiler room floor, but does not show in the photograph. Gas is utilized at 2 pounds pressure through Webster Radiant Burners. During six months of operation there has been no interruption in gas heat for any cause whatsoever. One boiler carries the entire load even in mid-winter when outside temperatures get down as low as 8° below zero for several days at a time. The increased combustion space in these boilers available with gas burners has made it practicable to operate either boiler at 200 per cent of rating by a simple change of damper setting and control valve. The apron type baffles, installed for gas operation, are conclusively proving the value of correct engineering consideration of combustion chamber and baffle design. Economy of these boilers with gas fuel is checking out about 5 per cent better than our estimates, indicating additional improvement in either combustion chamber or heat passes. The management of the hospital and the engineer in charge of the plant are well pleased with the installation and satisfied they made a good move when they changed to gas.

I am thoroughly convinced that many gas fired boiler jobs fail to give satisfaction, even in localities where gas is cheap, because of improper design of combustion chambers and incorrect

(*Continued on Page 39*)

Presenting the Merits of

GROUP APPLIANCE SELLING

By JACK TORBERT

New Business Manager
The Wyandotte County Gas Company,
*Kansas City, Kansas**

THE new business department or selling organizations of gas companies are charged with the responsibility of promoting the fundamental business of the gas company, which is that of ever increasing the sale of gas. The method of attack must be indirect, for the only method in which the sale of gas to our customers can be improved is through the sale of additional appliance conveniences. The measure of success which a new business department or selling organization attains cannot be measured merely by the gross volume of sales in dollars, but better, in the additional number of gas appliance units which are added to the lines. The gas customer is pleased with the additional modern gas conveniences which he has added to his home, and feels that he is getting value received for his gas bill; and the company benefits through the increased load. Consequently, gas company selling organizations are constantly seeking for ways and means which will facilitate the placement of gas appliance conveniences at a faster rate in customers' homes.

Jack Torbert

It is my pleasure to discuss here the plan of group appliance selling. The feature of this plan is, grouping together the appliances which gas users should have in their homes, and offering them at such liberal discounts and time payments that the customer is attracted to buy the entire group and have them installed at one time, rather than purchasing one gas appliance at a time at long intervals. This group is sold at one sale and all appliances installed by the installation department at one call. The customer is thus completely equipped at once with the fundamental gas appliances, and the maximum use of gas is assured.

The usual method followed in gas appliance merchandising has been to sell the customer one appliance at a time. During a gas range sale, for instance, the new business representative has called on a prospect who was principally interested in buying the gas range under the special inducements offered. Later, during a water heater campaign or incinerator campaign, the same procedure has been followed, the new business representative being interested principally in the sale of the particular item or appliance which was being campaigned. There has been, therefore, a duplication of calls and sales efforts, as well as the increased cost of the separate installation of these appliances at different periods—assuming that the representative was successful in selling a prospect all of them at various campaign periods.

These gas appliances can be so arranged that the sale of all of this equipment can be made at one time, at prices and terms so attractive to the customer that he cannot resist buying. If the customer sees there is a saving or larger discount if he buys two or more appliances, he at once becomes interested. Small discounts do not appeal to the customer; it is our view that the prices must be so attractive that if the sale is not made, it must be from some other reason than the price.

It has been our experience that a large percentage of the gas ranges sold are for replacement of obsolete or worn out equipment. The replacement of a gas range usually does not increase the consumption of gas, but it does insure a satisfied customer through the better service rendered and the added convenience of the new equipment. If, on the other hand, an automatic storage water heater is sold the customer with the gas range, the customer will receive the best of hot water service and the gas company will benefit through the increased gas consumption and revenues received.

Believing in the merits of the group selling of appliances, we decided about a year ago to try out this plan in our territory, and it has been so successful that we are carrying this plan of selling further this year. Last year the following plan was used:

On any group of appliances the customer may need, the sales price of the group equipment was set as follows:

First appliance, list
Second appliance, 10 per cent discount
Third appliance, 10 and 10 per cent discount
Fourth and all additional appliances, 10-10 and 10 per cent discount.

This discount was only applied where the customer bought the appliances all at one time and installation could be made by the installation department on one call. Deferred payments were used, of course, terms being five per cent cash with order, balance in easy monthly payments. If the customer chooses to pay cash we allow him five per cent discount.

This plan has made possible the building of gas sales per customer on present mains and new extensions to a figure which heretofore had never been realized in such a short time from such customers. To illustrate:

In connection with a new extension of the gas distribution system, the group sales plan was used and it was our endeavor to equip every new customer with a gas range, gas water heater, space heater or house heating installation, and incinerator. To over 50 per cent of the customers at least three of these appliances were sold, and the first year's operation showed gas sales per customer in this new territory of 82,000 cubic feet. Similar results have been shown by other gas companies in our territory.

This plan has proved so successful that we are going a step further in the year 1930. We have arranged a series of gas appliance groups and have gone even further in making the proposition attractive to the customers. I shall illustrate several plans which we are now putting into effect:

(Continued on Page 50)

*Presented at the Mid-West Regional Gas Sales Conference, conducted under the auspices of the American Gas Association Commercial Section, Chicago, February 14, 1930.

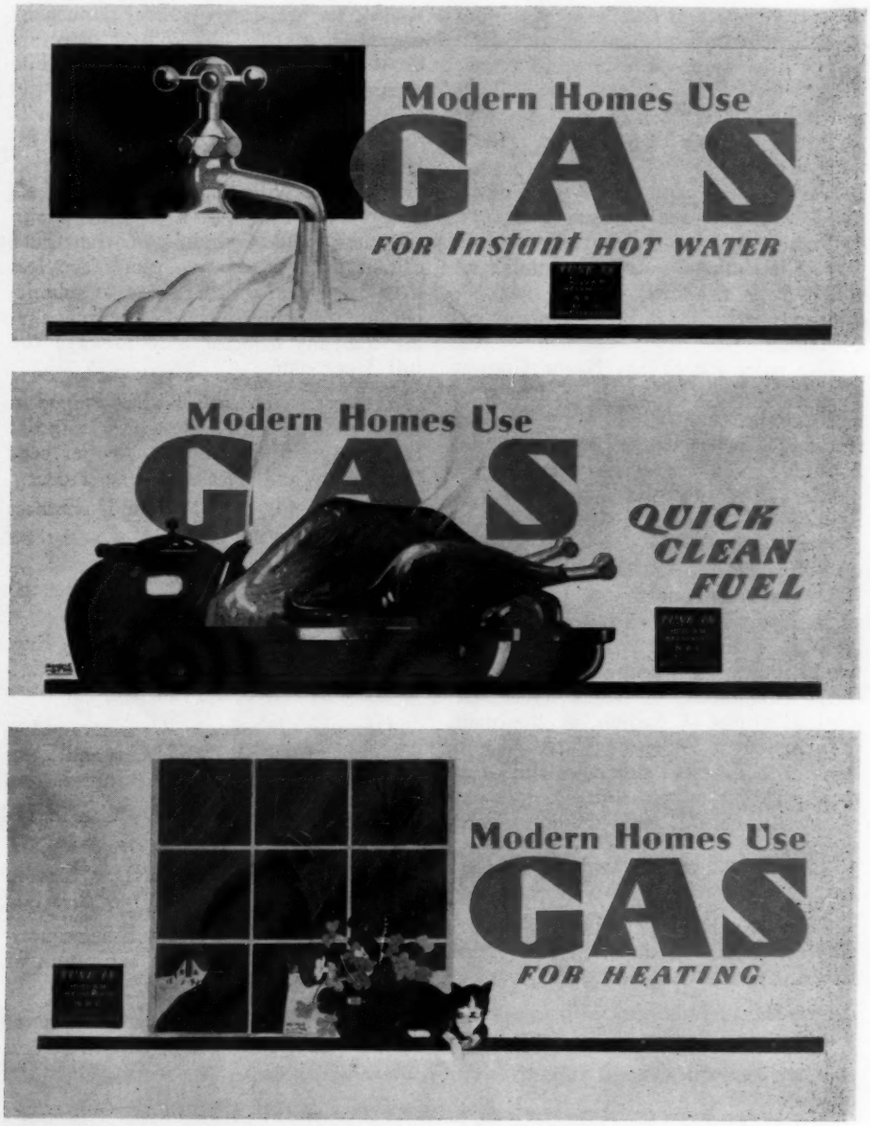
Gas Utilities Map Out Second Coastwide Advertising Appeal

By D. L. SCOTT

Chairman, Pacific Coast Gas Association Committee on Cooperative Advertising

AS is well known to all Commercial members of the Pacific Coast Gas Association through information mailed direct to them, plans are now complete for the continuation for another 12 months of the Coastwide cooperative advertising initiated through the Association last August.

These plans call for the expenditure of approximately $50,000 and involve the use of radio, trade journals and outdoor advertising, three mediums ideally adapted to cooperative advertising. Radio and outdoor advertising will be used to promote domestic sales, and the trade journals to promote industrial sales. The general theme pervading the copy prepared for all three mediums will be that *gas* is *the modern fuel;* it is *quick, clean* and *sure;* and it is *dependable, economical* and *flexible.* That these qualities are inherent in gas fuel is well known to all gas men, and the whole object of this cooperative effort is to make it equally well known to as many gas utility customers in Association territory as can hear, see and read.



Outdoor advertising will figure in this year's West Coast cooperative campaign. Copy shown above, to be placed on boards in Western population centers, will be released to tie in with local sales programs.

Radio

The first radio program of the new campaign was put on the air on February 12 and will be continued each Wednesday at 10:50 A. M. until our 52 messages have been delivered. The program is a feature of the Woman's Magazine of the Air of the National Broadcasting Company. This is an established radio feature and has a following of many thousands of women who can be likened to the subscribers to the more conventional printed magazine. The program is broadcast simultaneously from KGO, Oakland, KFI, Los Angeles, KGW, Portland, KOMO, Seattle, and KHQ, Spokane. It originates in the San Francisco studios of the National Broadcasting Company, with Benny Walker as editor and Helen Webster delivering our particular message.

For the first six months our weekly program consisted of short talks on what gas could do in the home if used correctly in modern appliances. Now we have introduced a character—a radio baby and Helen Webster will tell her listeners how modern gas service aids in caring for the little fellow. There is music and humor, of course, on each program and our increased mail indicates that the baby is going to be exceedingly popular. During the broadcast an announcement is made that a 46-page booklet, "Cookery with Gas," will be

(Continued on Page 55)

PACIFIC COAST GAS ASSOCIATION

447 Sutter Street, San Francisco, California
A Department Conducted by Clifford Johnstone, Managing Director

Rules for 1930 Convention Contests

AT A MEETING of the Executive Committee of the Public Relations Section held in Los Angeles on February 6, final approval was given to the rules which will govern the contests which have become such an important part of the work of the Public Relations Section.

As has been announced previously, there will be three contests this year, conducted by the Committee on Employees Relations with the Public, of which J. F. Pollard, general manager of the Seattle Lighting Company, is Chairman.

The rules for Stunts Night Contest to be conducted by D. L. Scott, manager public relations of Los Angeles Gas and Electric Corporation, were announced in February *Western Gas.*

The rules for the Three Minute Speaking Contests and the Essay Contest are summarized herewith. Letters setting forth these rules in complete detail have been sent to the public relations department of each company. In addition to the contests being conducted by Mr. Pollard's committee, the Women's Committee, of which Miss Mildred Hinrichs of Salinas, is chairman, will conduct a Women's Three Minute Speaking Contest under rules similar to those followed by the men. Women employees of course are eligible to enter the essay contest.

Essay Contest

Director: F. H. Holden, Southern California Gas Company, 950 South Broadway, Los Angeles.

Subject: "Modernize with Gas."

Those Eligible: All employees of member companies except executives and officials.

Prizes: 53 prizes totaling $400.

First prize, $50.00
Second prize, $30.00
Third prize, $20.00
Ten prizes, $10.00 each
Forty prizes, $5.00 each (These drawn by lot).

Requirements: Essays shall contain not less than 400 nor more than 1,000 words. They must be clearly written on one side of paper. The name of the writer or his company should not appear on the essay, but should be written on a card and enclosed in an envelope attached to the essay. Essays must be turned in to company contest directors between May 1 and June 14. The company contest director will have the essays submitted to him judged and will then forward the five best essays to Mr. Holden in competition for the 13 main prizes. He will also forward the balance of the essays in a separate group and these will be eligible for the prizes drawn by lot. If five essays are less than 3 per cent of all the essays submitted by the employees of one company, the company director may forward the full 3 per cent.

Judging: Each essay will be judged in accordance with the following standards: Knowledge of the Subject, 60 per cent Originality and Clearness 40 per cent.

Penmanship, grammar and neatness will not be considered.

Three Minute Speaking Contests

Director Men's Contest: Don C. Ray, Pacific Gas and Electric Company, 245 Market Street, San Francisco.

Director Women's Contest: Miss Mildred Hinrichs, Pacific Gas and Electric Company, Salinas, California.

Subject Men's Contest: "Gas in Industry."

Subject Women's Contest: "Gas in the Home."

Time Limit: Speakers will be requested to stop talking at the expiration of three minutes.

Those Eligible: All employees of member companies except executives and officials.

Prizes at each Convention Contest:

First prize, $50.00
Second prize, $25.00.

In addition the winners in each company contest will be given a trip to the Convention by their companies, with all expenses paid.

General: Each gas company member of the Association is entitled to appoint a company contest director who will conduct the Three Minute Speaking Contest within that company to determine on representatives for the Convention contests. There may be separate contest directors and separate contests for men and women. These company contests may be held at any time, but must be concluded on or before September 1.

Commercial Men to Have Tacoma Session, Mar. 21

AN informal meeting of the Commercial Section will be held in Tacoma, Washington, on March 21. J. Earl Jones, commercial manager of the Seattle Lighting Company and general chairman of the Commercial Section, will preside. Local arrangements will be in charge of Ralph W. Coblentz, assistant manager of the Washington Gas & Electric Company. A notice giving further particulars will be sent out direct from Association headquarters.

Northern Conference in Seattle June 26-27

THE annual Northern Conference of the Association will take place this year in Seattle on Thursday and Friday, June 26 and 27. Headquarters will be established at the Olympic Hotel and all meetings will be held in that building. James F. Pollard, general manager of the Seattle Lighting Company, will be in charge of local arrangements, but hotel reservations should be made direct with the Olympic Hotel, of course mentioning the Pacific Coast Gas Association. The program is now in course of preparation and will be largely a serious and detailed discussion of the special problems facing the industry in the Northwest.

Committee Appointments

G. L. Rogers, Gladding McBean & Co., Seattle, to Refractories Committee, Technical Section.

F. C. Jones, Pacific Gas and Electric Company; C. J. Melrose, Spokane Gas and Fuel Company, and Roy T. Richards, Central Arizona Light & Power Company, to Waste Disposal Committee, Technical Section.

Domestic Sales

In listing Commercial Committees in February *Western Gas,* the printer omitted the name of L. J. Brundige, Pacific

Gas and Electric Company, chairman of the Domestic Sales Committee. R. W. Coblentz of Tacoma, is chairman of the Sub-committee on Domestic Cooking.

Arizona Utilities Ass'n Convention in April

CONVENTION dates for the Arizona Utilities Association's annual meeting have been set for April 16, 17, and 18, at the Arizona Biltmore Hotel, near Phoenix. The Pacific Coast Gas Association will meet in joint session again this year with the Arizona group and all members who can make the three-day conference are urged to do so.

One entire morning will be devoted to a gas session, one to an electric session, and one to business sessions. Afternoons will be given over to short sessions of general nature, followed by golf, horseback riding, hiking, "rodeo-ing," and other recreation.

Officers and members of the Arizona Utilities Association stress the desire of their organization for a large California attendance at the coming annual convention and point to the attractions of the Arizona Biltmore and environs as an added inducement to be present in April.

Progress at Mid-Year Section Meetings

THE value of Association committee work to the industry and to the men who engage in it was strikingly shown at the recent mid-year sectional meetings in Los Angeles.

The Commercial Section met some 70 strong, on February 6 and 7, all committees reporting remarkable progress. Frank Weiss, vice-chairman of the Section, Clyde H. Potter, past chairman and Frank Moon, chairman of the Committee on Architects and

PACIFIC COAST GAS ASSOCIATION

Summary of Gas Company Operations Year 1929

	California*	Oregon**	Washington and British Columbia†	Idaho, Nevada, Arizona††	Total
PRODUCTION—M. C. F.					
Water Gas	272,072	122,061	2,604,295	42,864	3,041,292
Coal Gas	.....	43,495	1,474,676	88,937	1,607,108
Oil Gas	26,802,353	4,471,185	.....	1,030,280	32,303,818
Coke Oven Gas	.....	.....	665,965	.....	665,965
Natural Gas Purchased	131,465,551	.....	.....	.....	131,465,551
Total	158,539,976	4,636,741	4,744,936	1,162,081	169,083,734
CUSTOMERS—DECEMBER 31					
Domestic and House Heating	1,268,299	93,997	129,764	28,212	1,520,272
Industrial and Commercial	43,289	4,665	8,032	2,241	58,227
Total	1,311,588	98,662	137,796	30,453	1,578,499
SALES—M. c. f.					
Domestic and House Heating	55,239,392	3,462,728	2,890,000	761,245	62,353,365
Industrial and Commercial	71,686,547	773,056	1,300,000	200,427	73,960,030
Other Utilities	23,637,987	.....	.....	.....	23,637,987
Total	150,563,926	4,235,784	4,190,000	961,672	159,951,382
Sales to Users	126,925,939	4,235,784	4,190,000	961,672	136,313,395
GROSS REVENUE—DOLLARS					
Domestic and House Heating	51,027,568	3,493,458	3,878,443	1,325,085	59,724,554
Industrial and Commercial	15,334,404	668,918	1,304,414	294,092	17,601,828
Other Utilities	4,014,500	.....	.....	.....	4,014,500
Total	70,376,472	4,162,376	5,182,857	1,619,177	81,340,882
Revenue from Users	66,361,972	4,162,376	5,182,857	1,619,177	77,326,382
Miles of Main	17,276.5	1,998.5	2,608.6	347.1	22,230.7
Number of Employees	9,879	574	1,246	535	12,234
Annual Payroll—Dollars	16,034,205	869,869	1,830,000	585,998	19,320,072
Sales per Meter—Domestic and House Heating—M. c. f.	43.6	36.9	22.3	27.0	40.8
Sales per Meter—Industrial and Commercial—M. c. f.	1,658	166	162	89	1,269
Sales per Meter Total—M. c. f.	96.7	42.9	30.4	31.6	86.4
Revenue per M Sold—Domestic and House Heating—Cents	92.4	99.2	134.5	174.0	95.8
Revenue per M Sold—Industrial and Commercial—Cents	20.7	86.5	100.2	146.8	23.8
Revenue per M Sold Average—Cents	50.6	98.4	124.0	168.3	56.7

*14 out of 17 companies **All companies †7 out of 8 companies ††7 out of 9 companies

Contractors Manual, were in charge of arrangements.

On the same date Geo. L. Myers, chairman of the Public Relations Section, held meetings of the Section Executive Committee, made final arrangements for the Convention program, and drafted the several contest rules appearing elsewhere on this page.

D. G. Martin, chairman of the Accounting Section, also took advantage of the opportunity to confer with the other Section chairmen and D. L. Scott, chairman of the Program Committee on matters relative to the Convention program.

Two weeks later, on February 20 and 21, the Technical Section had its mid-year conference under the leadership of chairman Wm. Moeller, Jr. The Production, Natural Gas Transmission and Distribution Committees held parallel meetings during the mornings, while general sessions occupied the afternoons. The Gas Engineers Handbook Committee, Frank Wills, chairman, held meetings on February 19, 20 and 21. The Technical meetings were attended by over 100 members of the Section.

Committees — Why? When? Where? How?

By CLIFFORD JOHNSTONE
Managing Director
Pacific Coast Gas Association

THE gentle art of "passing the buck" has become the great American pastime, and nowhere has greater expertness and efficiency been attained than in our trade associations. The period to every discussion, the solution to every problem is "to appoint a committee." Of course every one hopes that the committee will function and that the problem will be solved, but at any rate the buck is passed and the only remaining care is to avoid appointment to the committee. This attitude toward committees is hard to understand because committees are really important.

Why Committees

Most of the constructive work done by the Pacific Coast Gas Association is done by its committees. As a matter of fact the work and play of the world is governed by committees. The President's Cabinet is an executive committee. Congress is a committee of the people, and each branch of Congress is in turn ruled by committees. Corporations are managed by committees called Boards of Directors, and President Hoover in creating his various fact-finding commissions has been appointing committees of experts to aid in his decisions. Committees are an essential tool in the creative work of any large group. In reality it is an honor to be appointed to a committee because it implies a recognition of one's knowledge and ability.

A question frequently asked is, "What do I get out of my investment in the Association." The answer that, "It gives you an opportunity to work on committees" often meets with considerable amusement, but nevertheless it can be proven that committee work within one's capacity can be made a most profitable endeavor. The thought put into writing letters and reports consolidates ideas; one receives at first-hand the ideas of others, and if the committee functions with any degree of success, considerable prestige accrues to it, with consequent favorable personal advertising to its chairman and members. A passive Association member gets a great deal from his membership if he will take it, but the man who digs in and takes part in the creative work of his industry reaps many fold for this extra effort.

Committees—When?

Committees should only be appointed when there is a need for them. It must be recognized that men are busy and will soon tire of being asked to give time and thought to trivial, wornout, or impossible problems. This requires judgment and a knowledge of the pressing and timely problems of the industry. In the Pacific Coast Gas Association the appointment of Committees rests with the Board of Directors and is delegated to the Section Chairmen, each carefully selected for his knowledge and experience and on his record as an Association committee worker. To aid in perfecting the section program, each Section has an executive committee composed of a representative of each company member of the Association. The plans are drawn up by the Section Chairmen, approved by the Board of Directors, and then referred to the Section Executive Committees for suggestion and the appointment of committee personnel. Inasmuch as the membership of Section Executive Committees does not change from year to year, a very satisfactory stability is attained which aids in securing continuity in the Section work.

This permanence of organization is carried even further. For instance, nearly every problem confronting the engineering organization of a gas company can be definitely placed as a production problem or a distribution problem. The Technical Section has therefore permanent committees on Production and Distribution, each made up of the principal production engineers or distribution engineers of member companies. The personnel remains practically the same from year to year. These committees outline the work in their respective fields and recommend the appointment of sub-committees to study specific problems. A third standing committee in the Technical Section is the Natural Gas Committee, which operates in a similar manner.

The Commercial Section has two standing Committees: Domestic Sales and Industrial Sales, each with a number of sub-committees, the number varying from year to year as problems arise and are solved. The Public Relations work also comes under two distinct classifications, those which are internal to the company, affecting the welfare and education of employees and their relation with the management, and those which are external, affecting the relation of employees with customers and the standing of the company in its community. The Accounting Section division is also distinct—Capital Records and Operating Records, each subject to several subdivisions as the need may arise.

The excellent contributions of the Pacific Coast Gas Association to the literature of the industry can be ascribed largely to the organization of its committee structure.

Where Do Committeemen Come From?

It is obvious that excellence of organization and care in the instruction of committees will both be wasted if the committee members themselves refuse or are incapable of doing their work. The major considerations in selecting the members of a committee are that

(1) The men selected must know and be interested in the subject.

(2) They must be willing and able to spend the time and effort required by the assignment.

(3) The committee must be representative of the industry; that is, its members must be so chosen that as a group it will include all important viewpoints of the problem in hand, as affected by geography or other limiting conditions.

In an Association as large as the Pacific Coast Gas Association and one representing such a tremendous and varied territory, the selection of effective committees has been a difficult problem. Happily a solution has been found in the organization of the Section Executive Committees which function not only to advise the Section Chairmen on the drafting of the program but also select the personnel of each committee. Each member company in the Association is represented on the Executive Committee of each section by an appropriate officer. Early in the year this officer receives the complete program of his section with the request that he select capable men from his organization for each committee. He naturally knows the problems in which his company is interested and he further knows better than anyone else the capabilities and interests of his men. To those committees which have been assigned a problem whose solution is of value to his company, he appoints his best possible man. To the balance he makes no appointment. The result is a compact and representative committee which will function excellently if its chairman provides it the proper leadership.

How Does A Committee Function?

Adequate leadership of a committee is the last essential to success. The deliberations of any group of men, no matter how small, will result in nothing tangible or at best will fritter away in desultory conversation unless there is one among them with the authority and ability to guide the thought and demand results. The chairman of each committee must accept this responsibility.

Upon his appointment he should first carefully study the instructions given him and be sure he understands what he has been asked to do. He should then study the work done by any previous committees on the same subejct in order to take advantage of their success or errors and to avoid needless repetition.

His first communication to the members of the committee should define the problems to be studied and the method of attack, and assign to each member a definite share in the work. It is a mistake for a chairman to introduce himself to his committee by asking for suggestions. When it is considered that a committee is seldom organized before December 1, and that its report should be written in June, we realize that there are only six months of working time. It comes at the busy season for gas company employees and a committeeman is fortunate if he can spare an hour a week of his working time to his committee, or say 26 hours per committee per year. There can be no lost motion or hesitation if results are to be attained. The chairman must take hold promptly and follow up vigorously.

Other than this, no general rules as to the conduct of a committee can be laid down. Some committees are assigned to the collection of data and others to research, and the procedure will of course vary. Occasional meetings are very helpful, but when this is impossible a great deal can be accomplished by correspondence. Questionnaires are greatly overworked and should be avoided. A properly selected committee will have all essential information at the command of its members, making a general questionnaire unnecessary. When the work is completed or when the time is up, the chairman should assemble his data and write the report. This should be done in sufficient time so that it can be sent to committee members for criticism before its final submission.

Preparing the Report

Many books have been written on the subject of preparing reports, and these are available in public libraries. Briefly stated, the first requisites are that one must have something to report and then state it in as few words as possible, consistent with clearness. Long quotations, non-essentials, and padding of every kind should be omitted. A report should of course be typewritten, double spaced, and proof read after it is typed. All tables and figures should be numbered and referred to by number in the text. The copy presented for publication should be accompanied by photographs and the original drawings, or tracings of them, done in india ink. Blue prints and photostats will not reproduce. Curves drawn on cross section paper should be drawn on blue line paper with the main lines traced over in india ink or should be traced, reproducing only the essential cross section lines. All photographs and drawings should be identified by their caption or figure number. It is helpful to accompany the report with a separate typed list of all captions. Footnotes or references should be placed in the body of the text, starting on the line immediately following the one containing the reference mark and separated from the main text by ruled lines. If there are a great many references they are best numbered consecutively throughout the report and the actual references placed in a group at the end.

In drafting the body of the report an outline is helpful, as it aids in assuring the author that all essential matter is included and all non-essential matter excluded.

Among things that are essential are:

An opening statement giving purpose and scope of report.

A description of apparatus and test procedure—if any.

A clear and logical presentation of the data or material forming the basis of the report.

A conclusion summarizing the opinion of the committee and the reasons therefore.

Among things that are non-essential are:

Any report which does not contribute to the knowledge of the industry.

Quotations from previous reports or from any accessible source. A reference is sufficient.

Derivation of well known formulae.

Detailed answers to a questionnaire. These can usually be summarized.

Lengthy expressions of personal opinion not supported by the data presented.

Any other form of verbal padding not contributing to the argument.

Gas Solves Fuel Problem *In a* Modern Hospital

(Continued from Page 33)

baffles in the tube passage. The tendency is to convert coal designed boilers to the use of gas by simply removing the grates or stokers and placing some burners in the front wall. Many successful installations have been made in this easy manner, but few engineers have taken the trouble to obtain test data on such installations, lest the figures be glaringly bad.

In arriving at correct design for gas, special consideration should be given the following factors:

1. Combustion characteristics of the gas used.

2. Barometric condition affecting the stability of draft conditions.

3. Per cent over-rating at which boiler must operate.

4. Combustion space available in which to liberate required heat without excessive temperatures on refractories.

5. Correct passage from combustion chamber to tube spaces.

6. Correct baffles for maximum heat absorption.

7. Damper for regulating draft.

8. Correct selection of burner and control equipment.

From my experience I would say there is much more economy to be realized through the correct application of gas burners than in the selection of the burners themselves.

Comprehensive Program Forming *for* Natural Gas Department Reunion

THE forming of a committee to publicize the Natural Gas Convention to be held in New Orleans, May 5 to 8, has been announced by Henry C. Morris, chairman of the Natural Gas Department through E. J. Stephany, secretary of the Department.

The committee is to be composed, according to Mr. Stephany, of gas company men located at strategic points, who will give publicity to the convention through the local press. The committee will also be on call at the New Orleans Convention to supply copies of convention papers and other information to the newspapers and trade press.

Pre-convention information will be released to members of the committee through Keith Clevenger of the American Gas Association headquarters department, and through J. C. Barnes of the New Orleans Public Service, Inc., who has been named as chairman of the committee.

Those appointed to assist Mr. Barnes are W. C. Grant, Lone Star Gas Company, Dallas; R. J. Daugherty, the Empire Companies, Bartlesville; Reid McBeth, Oklahoma Natural Gas Corporation, Tulsa; C. B. Greason, Gas Service Company, Kansas City; and John Fletcher, Arkansas Natural Gas Corporation, Shreveport. Keith Clevenger of the headquarters department will assist the committee and will act with them in an advisory capacity.

Information about hotel accommodations has just been released from the Department's Dallas office. Six hotels make up the list of recommended stopping placs, all of which are conveniently located with respect to the business sessions which will be held at the Roosevelt Hotel.

A list of the recommended hotels, number of rooms in each, and prices, appears on this page. The Tourists and Convention Bureau of the Association of Commerce of New Orleans, is assisting with room reservations. All of the second choice reservations are handled by this bureau.

A booklet giving information about New Orleans will accompany the first letter which will be sent out to Department members about the first of March. A second letter will be sent out at a later date announcing arrangements for reduced railroad rates.

H. C. Morris *E. J. Stephany*

A tentative schedule of the subjects of papers appearing on the convention program, together with the names of those who will present them, follows:

"Pacific Coast Natural Gas Development."

"Leak Detection and Prevention in Congested Cities," by Dr. J. B. Garner, Peoples Natural Gas Company, Pittsburgh, Pa.

"Development of Larger Industrial Sales," by W. M. Little, Cities Service Gas Company, Bartlesville.

"Application of Degree Day Efficiency to Computing Domestic and Heating Load," by R. M. Redding, Dallas Gas Company.

Other papers planned, include "Conservation in Louisiana;" "Gas Field Studies;" "High Pressures in Pipe Line Transportation;" "Public Relations and Advertising;" "Building Domestic Load by Selling Appliances."

Some of the subjects to be discussed before the Open Forum, include:

"Recent Progress in Saturation of Natural Gas with Oil and Water or with Water" led by H. L. Gaidry of the New Orleans Public Service Inc.

"The Relative Advantages of Displacement in Orifice Meters," led by George P. Sheppard, United Gas Company.

Other subjects include: "Handling Water in Well and Field Drips;" "Building Up Load in Southern Climate with Large Percentage of Colored or Foreign Population;" "Selling House Heating;" "Pipe Corrosion." Only three out of the four last mentioned subjects will probably find a place on the Open Forum program, since it is planned to have but five subjects appear for discussion, thereby providing ample time for general discussion. J. D. Creveling of Henry L. Doherty & Company will serve as chairman of the Open Forum discussion periods.

The New Orleans Convention Committees are composed of the following:

Arrangements and Enntertainment Committee: A. B. Paterson, Chairman, New Orleans Public Service, Inc., New Orleans, Louisiana; Wallace Blocker, Houston Natural Gas Company, Houston, Texas; O. Christopher, Montana Petroleum Company, Baker, Montana; R. W. Gallagher, East Ohio Gas Company, Cleveland, Ohio; N. K. Moody, Prairie Oil and Gas Company, Independence, Kansas; R. C. Hoffman, Jr., Southern Cities Public Service Co., Atlanta, Georgia; J. R. Munce, Arkansas Natural Gas Corporation, Shreveport, Louisiana; F. F. Schauer, Equitable Gas Company, Pittsburgh, Pennsylvania; C. N. Stannard, Public Service Company of Colorado, Denver, Colorado; T. R. Weymouth, Oklahoma Natural Gas Corporation, Tulsa, Oklahoma; W. S. Yard, Pacific Gas and Electric Corp., San Francisco, California.

Program Committee: N. C. McGowen, Chairman, Louisiana Gas and Fuel Company, Shreveport, Louisiana; F. L. Chase, Lone Star Gas Company, Dallas, Texas; W. A. Dunkley, Memphis Power and Light Company, Memphis, Tennessee; L. Fitzpatrick, Utah Gas and Coke Company, Salt Lake City, Utah; A. C. Howard, Dixie Gas and Fuel Company, Houston, Texas; A. E. Merchant, New Orleans Public Service, Inc., New Orleans, Louisiana; H. L. Montgomery, Cities Service Gas Company, Bartlesville, Oklahoma; T. J. Strickler, Kansas City Gas Company, Kansas City, Missouri; George Wehrle, Public Service Company of Colorado, Denver, Colorado.

Ladies Entertainment Committee: Mrs. A. B. Paterson, Chairman, New Orleans, Louisiana.

HOTEL ACCOMMODATIONS

		Rates with Bath	*Rates without Bath*
De Soto, 420 Baronne Street	250 Rooms	Single $3.00 to $4.00	$2.00 to $2 50
		Double $4.00 to $7.00	$3.00 to $4.00
Jung, 1500 Canal Street	700 Rooms	Single $3.00 and $3.50	None
		Double $5.00 and $6.00	None
Marbere, 1300 Canal Street	300 Rooms	Single $2.50 to $4 50	None
		Double $4.00 to $6.00	None
		Twin Beds $6.00 and $7.00	None
Monteleone, 214 Royal Street	600 Rooms	Single $3.50 and $4.00	None
		Double $5.00 and $6.00	None
		Twin Beds $6.00 and $7.00	None
Roosevelt	700 Rooms	Single $4.00 to $6.00	None
		Double $6.00 to $7.00	None
		Twin Beds $8.00 to $9.00	None
Saint Charles, 211 Saint Charles Street	600 Rooms	Single $3.00 and Up	$2.00 and Up
		Double $5.00 and Up	$3.50 and Up

Write direct to the hotel selected in making reservations, indicating second choice of a hotel. If the space desired is not available, reservations will be made at some other hotel.

M. A. HARDIE TO ASSIST ELI CUNNINGHAM AT HOUSTON

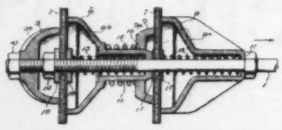
Mark A. Hardie of the Southern Gas Company at San Antonio, Texas, has been transferred to Houston to assist Eli Cunningham of the Houston Gulf Gas Company and Dixie Gas and Fuel Company, both United Gas subsidiaries and controlled by Moody-Seagraves interests.

FARMINGTON, NEW MEXICO, GETS NATURAL GAS SERVICE

Natural gas was turned into the mains at Farmington, New Mexico, on February 9. Southern Union Gas Company, with headquarters in Dallas, Texas, is holder of the franchise.

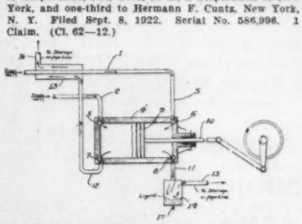
THIS MONTH'S PATENTS PERTAINING TO THE INDUSTRY

1,732,277. PIPE CLEANER. JOHN HENRY OWENS, Elgin, Ill. Filed Jan. 9, 1928. Serial No. 245,433. 10 Claims. (Cl. 15—104.16.)



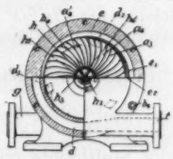
1. A pipe cleaner comprising a central stringer rod having a plurality of resilient working disks spaced apart coaxially thereon, in combination with means to vary the effective gauge of said disks, said means including a series of cups of diverse sizes strung slidably on said rod coaxially therewith and arranged in pairs facing concavely against said disks, together with screw means on said rod to urge said cup and disk members together, the cups of each of said pairs being of different diameters whereby their edges are out of mutual registry, whereby said disks may be dished.

1,747,761. NATURAL-GAS LIQUEFACTION. HORACE DUMARS, New Suffolk, N. Y., assignor, by direct and mesne assignments, of two-thirds to Bowen-Dumars Power Corporation, New York, N. Y., a Corporation of New York, and one-third to Hermann F. Cuntz, New York, N. Y. Filed Sept. 8, 1922. Serial No. 586,996. 1 Claim. (Cl. 62—12.)



The process of liquefying natural gas as delivered at two points from the well, comprising admitting a portion of the gas at well temperature and pressure to an expansion engine, thereby reducing the pressure and temperature of the gas, controlling the temperature and pressure to keep said gas from liquefying in said expansion-engine, passing the cooled gas from said expansion device into heat-interchanging relation with the other portion of gas at well temperature and pressure, and admitting said second portion of pre-cooled gas to a second expansion engine, so designed as to expansive capacity to liquefy at least a portion of said gas.

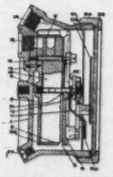
1,689,420. ROTARY AIR PUMP. FRANZ LAWICZECK, Munich, Germany, assignor to Worthington Pump and Machinery Corporation, New York, N. Y., a Corporation of Virginia. Filed Sept. 29, 1926. Serial No. 138,352. 6 Claims. (Cl. 230—108.)



1. A rotary air pump comprising a casing, a runner having blading cells therein, a distributor for the supply and discharge of air to and from the runner, means for introducing fluid under pressure to the periphery of said runner for compressing and discharging the air from the runner and means for discharging the pressure fluid from the periphery of said runner for drawing in a further supply of air to be compressed, said pressure fluid constituting the sole means for rotating the runner.

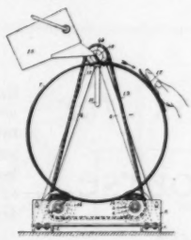
1,684,316. FLUID-FLOW METER. WILLIAM WILSON HAMILL, Birmingham, England. Filed Oct. 12, 1922, Serial No. 594,205, and in Great Britain Oct. 28, 1921. 3 Claims. (Cl. 73—167.)

1. A flow meter, comprising a substantially cylindrical casing having a wall at its rear end and its forward end open and provided with an outlet at its upper portion, a substantially cylindrical member of smaller external contour than the interior of said casing, said cylindrical member having its rear end closed and its forward end open, the rear end of said member being detachably secured to the rear wall of said casing in substantially concentric relation with the latter, a cover plate for the forward end of said member, spaced from the latter to afford a passage for fluid from said member to the space between said member and the interior of said casing, said member and cover forming a supply chamber, a spindle



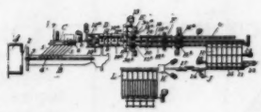
extending through said cover and having its rear end journalled in the rear end of said member at approximately the center of said rear end, a journal for the forward end of said spindle carried by said cover, a vane in said supply chamber secured to said spindle, said vane being throughout its length of substantially the same width as the depth of said supply chamber and subject throughout its extent to the flow of fluid through said supply chamber, a partition extending from the axis of said supply chamber to the side wall of the latter, said vane in its normal position being in close proximity to said partition, said casing having an inlet opening and said cylindrical member having an inlet opening registering with that of the casing for admitting fluid into said chamber between said partition and said vane, means for returning said vane to normal position, a dial and a pointer associated with the front face of said cover and said vane, said dial and pointer being relatively movable during the movement of said vane, and transparent means detachably closing the forward end of said casing.

1,733,606. METHOD OF COATING PIPES. HUGH M. COOK, New York, N. Y., and LORLYS R. ROGERS, Cottage Hill, Fla., assignors to Wallex Dove-Hermiston Corporation, New York, N. Y., a Corporation of New York. Filed July 17, 1929, Serial No. 379,003. 2 Claims. (Cl. 91—68.)



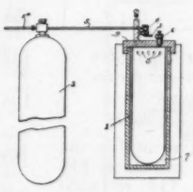
1. The herein described method of applying coating material to a pipe, including first revolving the pipe, applying the coating material while hot on the top of the pipe, and applying a pad of non-conducting material in flat contact with the coating material to uniformly spread the coating and to prevent overflow of excess coating.

1,726,347. MANUFACTURE OF BUTT-WELD PIPES. HARRY E. GROSS, Dormont, and OTTMAR M. TISHLARICH, Bellevue, Pa., assignors to A. M. Byers Company, Pittsburgh, Pa., a Corporation of Pennsylvania. Filed Mar. 31, 1927. Serial No. 179,856. 19 Claims. (Cl. 78—88.)



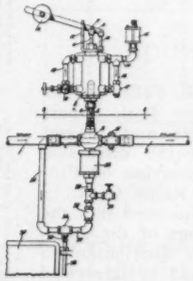
1. The method of manufacturing buttweld tubing which consists in drawing the skelp through a forming die at welding temperature, removing the tong end of the tube while it is still hot to bring the edges thereof into abutting relation and weld the same, and then passing the tube while still hot over a pipe ball between rolls.

1,747,366. METHOD OF AND DEVICE FOR THE REGASIFICATION OF LIQUEFIED GASES. CHRISTIAN WILHELM PAUL HEYLANDT, Berlin-Lankwitz, Germany. Filed Feb. 16, 1928, Serial No. 254,913, and in Germany Mar. 29, 1927. 6 Claims. (Cl. 62—1.)



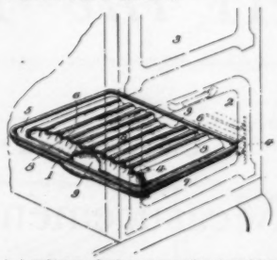
1. The process of gasifying liquefied gases which consists in filling said gases into a vessel insulated against heat, and treating the insulating medium to cause the same to act as a heat-exchanging medium.

1,689,249. STEAM AND LIQUID CONTROL MECHANISM. WALTER C. MITCHELL, St. Louis, Mo. Filed Feb. 25, 1927 Serial No. 171,021. 9 Claims. (Cl. 137—139.)



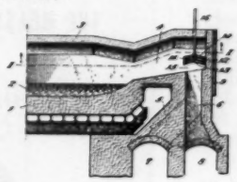
1. Mechanism for controlling the passage of fluids comprising a valve housing, an influent pipe to said housing, an effluent pipe from said housing, a valve in said housing for opening and closing communication between said pipes, a by-pass pipe from said influent pipe to said effluent pipe, a device in said by-pass pipe adjustable to permit a desired amount of fluid to pass continuously from said influent pipe to said effluent pipe, a piston for opening said valve, a pipe for conducting fluid from said influent pipe to one side of said piston, a rotary valve for opening and closing said last-named pipe, and optionally operable means in connection with said last-named pipe between the valve therein and said piston permitting exhaust of fluid from said last-named pipe.

1,732,910. COMBINED BROILER AND ROASTING PAN. MINARD A. POSSONS, Cleveland, Ohio, assignor to American Stove Company, St. Louis, Mo., a Corporation of New Jersey. Filed Aug. 7, 1928. Serial No. 297,938. 3 Claims. (Cl. 53—5.)



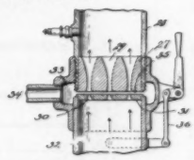
1. A cooking pan having a surrounding channel located in a horizontal position, an upwardly projecting central portion extending in a direction of a plane passing through the top edge of the channel said central portion having relatively shallow corrugations draining to the said channel whereby a broiler is formed when the device is turned with the open side of the channel upwards and a relatively deep pan is formed by the inner wall of the channel when the device is reversed.

1,726,606. FURNACE. MOSES APPEL, Johnstown, Pa. Filed Oct. 28, 1921. Serial No. 511,224. 6 Claims. (Cl. 263—15.)



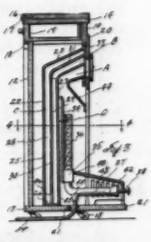
1. In a reversing furnace provided with gas and air ports at each end thereof, deflectors arranged adjacent to the mouths of said ports and provided with means for adjusting their position with respect to said openings.

1,677,811. GAS BURNER. WILLIAM SPENCER BOWEN, Westfield, N. J. Original application filed Apr. 11, 1924, Serial No. 705,919. Divided and this application filed Sept. 21, 1927. Serial No. 221,034. 10 Claims. (Cl. 158—99.)



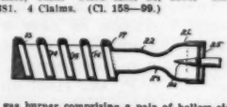
9. An apparatus of the character described, including two superposed and separated tubes, one being movable relatively to the other to regulate the area of the intervening space, means for supplying gas at said space, a pair of perforated members, one mounted in the lower end of the upper tube and the other mounted in the upper end of the lower tube, means for moving said tubes to vary the space between said perforated members, and an ignition means mounted in the upper tube.

1,726,000. PORTABLE HEATING CABINET. THEODORE A. SALA, Dallas, Tex. Filed Mar. 2, 1928. Serial No. 258,485. 4 Claims. (Cl. 126—92.)



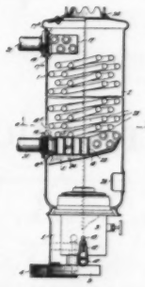
1. A portable heating cabinet comprising an article of furniture having an open front and an imperforate top with connected base, side and rear walls, and an exposed heating unit with associated air flues at its rear inset within the cabinet at the open front thereof and supported by said base.

1,723,988. GAS BURNER. THOMAS G. ARROWSMITH, San Francisco, Calif. Filed Mar. 16, 1927. Serial No. 175,081. 4 Claims. (Cl. 158—99.)



1. A gas burner comprising a pair of hollow side bars, hollow slotted cross bars each of which is inclined upwardly away from the direction of the delivery of the gas to the hollow side bars to which the slotted cross bars are connected, and means to deliver the mixed air and gas substantially at right angles to the center of the first cross bar of the series, then to the hollow side bars, and successively to the remaining cross bars of the series, the slots in said cross bars being a small fraction of the width of the passageways in the interior of said successive cross bars.

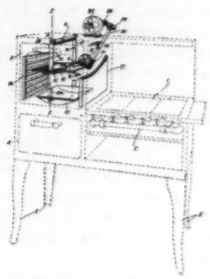
1,726,686. WATER HEATER. LEWIS T WILCOX, Peekskill, N. Y., assignor to Wilcox Patents Corporation, Peekskill, N. Y., a Corporation of New York. Filed Nov. 16, 1926. Serial No. 148,648. 7 Claims. (Cl. 122—250.)



1. A water heater comprising a casing, two manifolds within the casing, one above the other and each secured to the casing wall and opening externally thereof, a plurality of water coils in the casing extending between and connecting the two manifolds, the lower manifold having a plurality of lateral projections along its length, and a source of heat underneath the lower manifold.

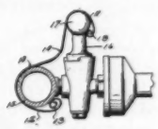
1,747,325. RANGE. MAX SCHEY, Brooklyn, N. Y. Filed Apr. 26, 1927. Serial No. 186,752. 18 Claims. (Cl. 126—41.)

1. In an assembly of the character described, an oven, pit supporting means positioned within the oven and mounted for movement into and out of the oven, a spit carried by the spit supporting means for rotation thereon,



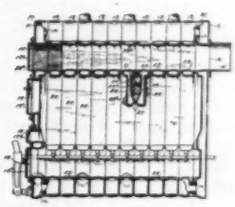
and spit rotating means associated with the oven and adapted to be engaged by the spit when the spit supporting means is moved into the oven.

1,726,979. GUARD FOR GAS-BURNER TAPS. WILLIAM J DNOSZEWSKI, Audubon, N. J. Filed Oct. 29, 1927. Serial No. 229,720. 2 Claims. (Cl. 126—42.)



1. A guard for gas burner taps formed of a strip of resilient sheet metal, the middle portion of the strip being bent inward on a median line, the marginal portions of said strip on each side of said median line being approximately U-shaped in cross section, one of said U-shaped portions being smaller in cross section than the other of said U-shaped portions and being disposed with the arms of the smaller U-shaped portion at right angles to the larger U-shaped portion, the larger U-shaped margin of the strip being adapted to engage around the gas pipe of a gas stove, the smaller of the U-shaped margins being adapted to engage over and embrace a series of taps coacting with the gas burner pipes when the handles of the taps are disposed in alinement.

1,683,837 BOILER. ANDRÉ M. MERTZANOFF, New York, N. Y., assignor to American Radiator Company, New York, N. Y., a Corporation of New Jersey. Filed Oct 5, 1925. Serial No. 60,699. 7 Claims. (Cl. 122—225.)



1. A boiler of the character described comprising front, back, and intermediate sections communicatively connected, certain of said intermediate sections each having a depending water containing member communicating with the water spaces of the boiler and arranged parallel in spaced relation to form therebetween a transverse duct having a constricted discharge opening at its base, and horizontal partitions dividing the end portions of said duct to form upper passages open at the outer ends thereof for conducting air to a point intermediate the ends of said duct and discharging the same into the lower portions thereof, substantially as specified.

With *the* Metermen

Distribution *of* Lessons Begins *for* S.C.M.A. Gas Measurement Course

IT WAS apparent at the monthly meeting of February 27, that the Extension Course in Gas Measurement introduced by the S. C. M. A. through its Educational Department is well on its way. Actual distribution of first lessons began on March 1 to those already enrolled. Officers and directors of the Association are highly gratified with the reception which has greeted preliminary announcements of the Extension Course. Enrollments have already been received from 11 Western, Mid-Continent, and Middle Western states. The S. C. M. A. membership is itself responding heartily to the plea for early enrollment. Many applications from members were among the first to be received.

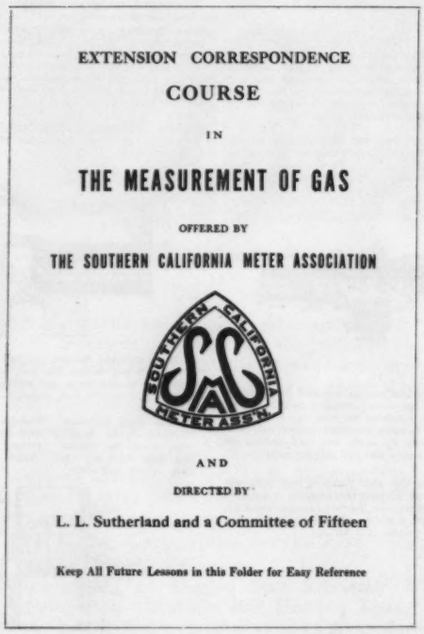
The Educational Committee urges that as many as possible among the metermen and measurement engineers who are interested in enrolling for the course send their applications in time to start with the first lesson set. This set, contained in a folder the front cover of which is illustrated above, is being sent out as rapidly as applications are received.

There is every indication that the course will prove a valuable contribution to the industry. It will contain lectures by Prof. L. L. Sutherland, educational director for the Association, and also each assignment will be accompanied by a practical lecture from outstanding measurement engineers of the West.

A proper certificate of completion will be awarded those who satisfactorily finish the list of 20 lessons. Personal attention will be accorded every student, and every precaution is being taken to make the course of practical use.

When assembled in the folders provided, the 20 lessons will comprise an unique reference file, such as is nowhere available at the present time.

As announced in the "With the Metermen" department of *Western Gas* last month, enrollments may be made by letter,



Reproduction of front cover of folder prepared for filing lessons in gas measurement extension course.

accompanied by the initial payment for the course. Total cost for the 20 lessons is $17 to Association members and $18 to non-members. Payment may be made $8 with the application and the balance in two equal monthly installments. Enrollments should be sent to the following address:

Southern California Meter Association, 810 South Flower Street, Box 1100, Station C, Los Angeles, California—attention of L. L. Sutherland, educational director.

Excellent Program *at* February Meter Session

AN unusually interesting program of papers, combined with discussion of the Southern California Meter Association's recently inaugurated Extension Course in Gas Measurement, made the February 27 meeting of that organization an outstanding one. The dinner and business session was held at Marchetti's in Los Angeles, with 93 members and visitors present.

More than a score of new members were announced, raising the Association's roster to a total of nearly 250.

Otto Goldkamp, of the San Diego Consolidated Gas and Electric Company, delivered the first paper of the evening, entitled "Positive Displacement Dry Gas Meters." "Measuring Gas Flow under Varying Pressures with the Chart-Rim Planimeter" was the subject discussed by T. F. Falls of the Brown Instrument Company. Both papers were accompanied by slides and proved extremely interesting. General discussion followed each, under the direction of Program Committee Chairman Ralph Cook.

President R. F. Angell announced that the 1928-1929 Annual Proceedings of the Association is now available for distribution to members. Copies may be had by interested non-members at a price of $1.50 each.

P. W. Hill, on behalf of the Association's Educational Committee, gave a resume of the extension Course in Gas Measurement, which was also discussed at length by President Angell.

On February 23 the Association's Good-Fellowship Golf Tournament was held at the Rio Hondo Golf Club, prizes being awarded at the monthly meeting of the membership. These went to the following:

Low net—to A. F. Mitas, Pacific Pipe and Supply Company. The name of the winner of low net goes on the S. C. M. A.—*Western Gas* Good Fellowship Trophy.

Low gross—J. Schomberg, Pacific Pipe and Supply Company. Award, $6.00 in cash, contributed by the Pacific Meter Works.

Second low gross—F. S. Burt, General Petroleum Corporation. Award, $4.00, contributed by Pacific Meter Works.

Data Sheets Cover Wide Subject Range

THE S.C.M.A. Standards Committee, which has in hand the important activity of issuing data sheets on topics related to measurement, to date has prepared the following sheets, all of which have been made available to members in Lefax size:

Number	*Title*
101	Hourly Coefficients for Orifice Meters, 14.73 lb. Pressure Base. Line (2½ and 8 diameter) Connections.
102	Hourly Coefficients for Orifice Meters, 14.73 lb. Pressure Base. Flange Connections.
103	Temperature Correction Factors for Orifice Meters.
104	Specific Gravity Multipliers for Orifice Meter Calculations .50 to 1.00.
105	Specific Gravity Multipliers for Orifice Meter Calculations 1.00 to 1.50.
106	Velocity Coefficients C_v for Orifice Meters Line (2½ and 8 diameter) Connections.
107	Velocity Coefficients C_v for Orifice Meters Flange Connections.
108	Check-Readings for Square Root Charts for Westcott Meters.
109	Standard and Extra Heavy Flange and Flange Fittings.
110	Conversion Factors.
111	Properties of Saturated Steam.
112	Screw Threads.
113	Decimal Equivalents.
114	Formula for Liquid Meter Coefficients.
115	Relative Humidity.
116	Volume Correction Chart.
117	Temperature Corrections for Mercurial Barometer with Brass Scale.

Extra sheets are available at a charge of 2c per sheet to members, and 3c per sheet to non-members, in lots of five or more sheets. In lots of less than five the charge is 5c per sheet. These may be obtained by sending orders, with the necessary money, to G. S. Duncan, Secretary, Southern California Meter Association, Box 1100, Station C, Los Angeles, California.

CAD CLOVER GOES TO HOUSTON FOR WESTCOTT & GREIS

Cad Clover of the Tulsa branch of Westcott & Greis, Inc., has been transferred to the Houston, Texas, office of the company, taking the place of J. J. Delaney, who left Houston in February.

Positive Displacement Dry Gas Meters

By Otto Goldkamp

*San Diego Consolidated Gas and Electric Company**

NEARLY all business is done for the purpose of profit, either for the present or the future. It is obvious that the return from such a business should be sufficient to take care of the cost of materials; the manufacture, sale and distribution of its product; and the depreciation of equipment used for its production, and still leave a reasonable profit on the capital invested.

Otto Goldkamp

Proper cost accounting will establish all these essential factors in a successful business. However, the aggregate of all these costs, including the margin of profit, is dependent upon the accuracy of the means whereby product or commodity is weighed or measured "into the possession of the consumer."

This is particularly true in the gas business because of the vast amount of measuring equipment required to market our product. The proper size of equipment to use and the accurate maintenance of such equipment, most of it remotely located from the point of production, are problems which demand careful attention from the industry. In this respect we differ from most other industries and business, as few, if any of them are required to furnish an individual means of measurement to each customer. To secure such equipment reasonable in first cost, well made, of proper material and design, durable and capable of stable accuracy over long periods of service at the lowest possible maintenance cost consistent with good performance, has always been a problem of considerable magnitude since the inception of the gas industry.

While it might be of historical interest to trace the influence of this problem thoughout the development of the industry, and its effect upon the evolution of meter design from the beginning, such a narrative would be of doubtful value and probably would not appeal to most members of this Association. For this reason we will confine our description and discussion to modern practice, with a brief consideration of the fundamental laws underlying the design of the dry gas meter.

The positive displacement dry gas meter is the type of meter most generally accepted throughout the world wherever gas is consumed as a domestic fuel. These meters are also made in sizes appropriate for use on small industrial installations, it being found practical, when necessary, to manifold in parallel as many as 10 or 12 meters at one time.

This type of meter has two forms of construction, the tin plate and the cast iron case, and is manufactured in a number of different makes involving various mechanical means, while retaining the same principle of operation: namely, that of alternately filling and discharging its leather diaphragm chambers. The positive displacement of the gas, or, in other words, the alternate filling and emptying of each compartment, sets up a reciprocating movement of the diaphragm in that compartment; and this movement is communicated

*Presented before the Southern California Meter Association, February 27, 1930.

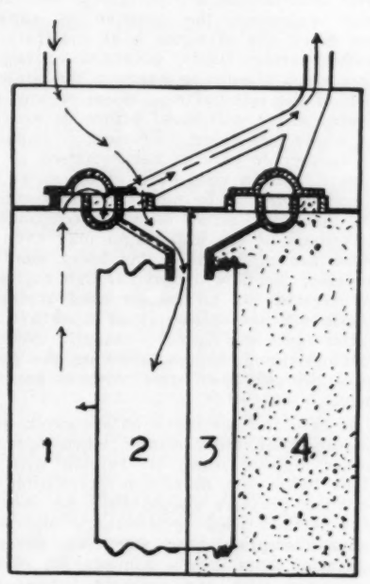


Fig. 16. Compartment 1 is emptying, 2 is filling, 3 is empty, and 4 has just filled.

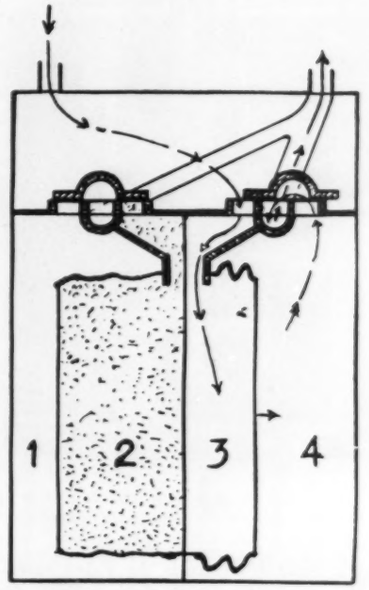


Fig. 17. Compartment 1 is now empty, 2 is full, 3 is filling, and 4 is emptying.

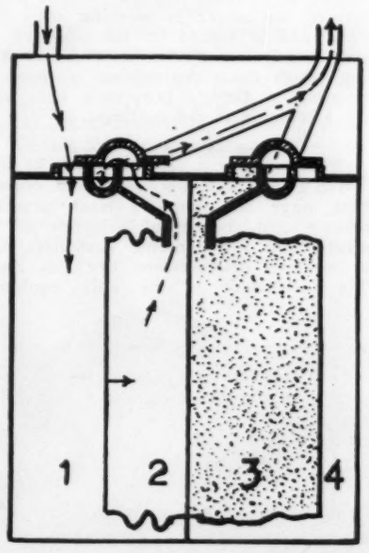


Fig. 18. Compartment 1 is filling, 2 emptying, 3 has filled, and 4 has emptied.

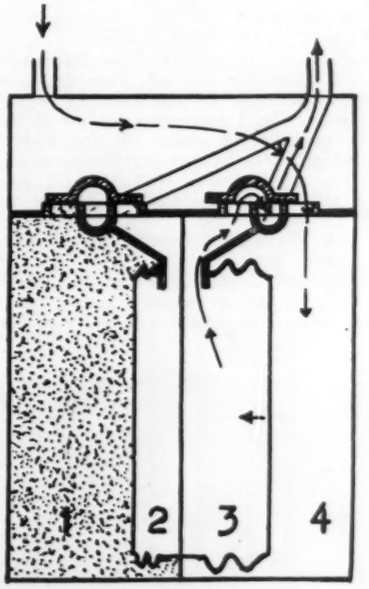


Fig. 19. Compartment 1 is now completely filled, 2 is empty, 3 is emptying, and 4 is filling.

THE four figures reproduced above are from Bureau of Standards Circular No. 309, page 28, and show the complete cycle of operation of a dry gas meter.

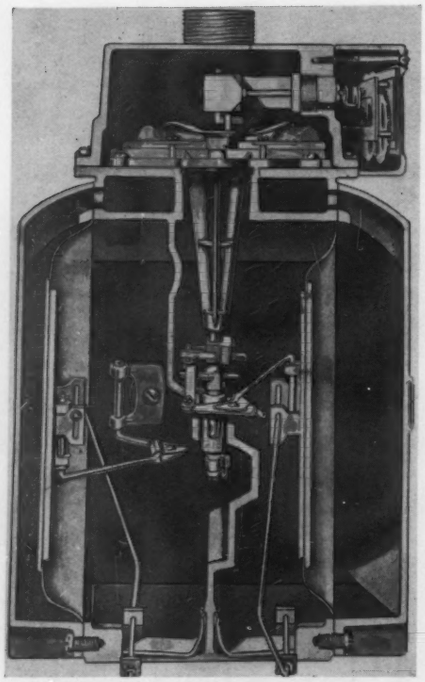


Fig. 1

through suitable means to the valve assembly and means of registration without absorbing more than a small portion of the pressure. The valves are so timed that one side of the meter is sealed off gas tight, one compartment filled and the other empty; and on the other side one compartment is discharging as the other is filling.

Figs. 16, 17, 18 and 19, from Bureau of Standards Circular No. 309, Page 28, show the complete cycle of operation of a dry gas meter. Fig. 1 represents a view of one of the well known makes of iron meters, from which it can be seen that the principles involved are identical with the tin case meter, although the mechanical features are quite different. Figs. 2 and 3 show the valve and diaphragm assembly in one make of tin meter.

All positive displacement dry gas meters have a gas output capacity rating based on the pressure absorbed to measure or displace the gas through the meter. For ordinary domestic meters the American Gas Association recommends a pressure drop of 0.5 inches water column as the basis of this rating.

Iron case meters, when of proper design, are used in some instances on pressures up to 500 pounds per square inch. Whenever large iron meters are used on industrial installations, and the gas is metered at high pressures, the question of capacity per given size of meter is an arbitrary one within certain limits, governed entirely by how much absorption pressure the construction of the internal mechanism of any particular meter will stand before its accuracy as a gas measuring instrument is impaired. If reasonable care is not exercised in this regard, certain vital parts of the meter may become worn. The parts used to synchronize the valve action with the reciprocating movement of the diaphragm may even become broken. Should this latter condition develop, the flow of gas through the meter is arrested for an instant until the outlet pressure drops sufficiently to cause a differential pressure great enough to burst through the diphragm, allowing the gas to pass through the meter without measurement.

If care and consideration are given to the operation of these meters when operating under high pressure, observation will soon show what the maximum permissible absorption pressure should be. An inexpensive method used to determine the maximum absorption over any cycle of meter operation is to install, temporarily, an orifice meter with one pressure tap as near the inlet and the other as near the outlet as possible.

When meters are operated on these high pressures, they are usually equipped with recording volumetric pressure gages which indicate and record the gas output at the pressure the meter is working on. This record and a record of the pressure are made simultaneously on a 24-hour chart, from which chart the volume is corrected, according to Boyle's law, to a base pressure acceptable to the customer.

TIME PROVEN SERVANTS

Science and invention, during 87 years of effort, have not found a more practical, accurate and economical principle of gas measurement for domestic customers, than the positive displacement dry gas meter. This instrument is the only equipment available to the industry which can be placed in service for long periods of time, without further attention, and still have

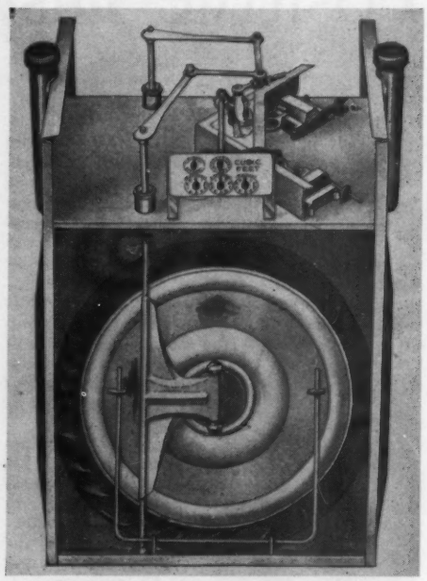


Fig. 3

the necessary qualifications for measuring gas at rates of flow ranging from a mere trace up to the maximum capacity of such meter.

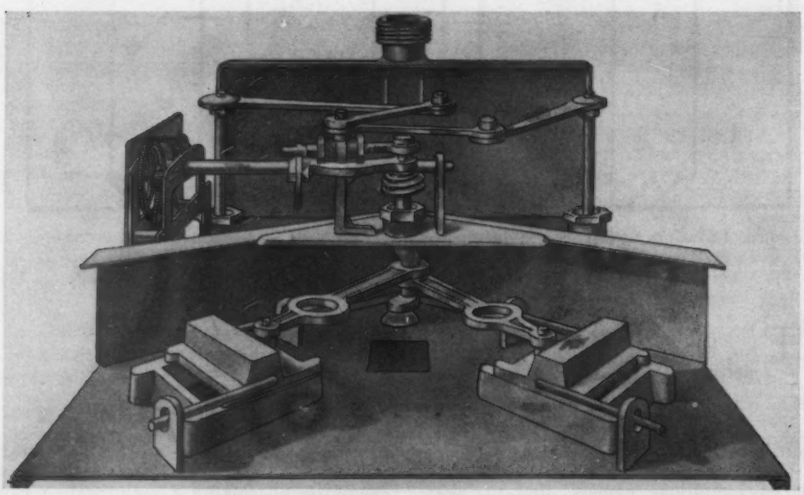


Fig. 2

COMMUNITY NATURAL DISTRICTS ARE REARRANGED

The Sweetwater district and the Eastland District of the Community Natural Gas Company have been rearranged, and the towns of Eastland, Strawn, Gordon, Albany, Moran, Putnam, Baird and Clyde are now operated under the Eastland district office with L. B. Denning, Jr., as district superintendent. All of the towns west of Abilene having Community Natural service are in the Sweetwater district under the supervision of L. M. Scholl, district superintendent, with headquarters at Sweetwater.

The Community Natural Gas Company maintains headquarters at Dallas, Texas.

P. G. AND E. NET PROFITS TOTAL $15,740,486

Net profits of the Pacific Gas and Electric Company of San Francisco, and subsidiaries for 1929 were announced in February at $15,740,486.

These earnings compare with $13,402,338 reported earned for 1928.

Gross revenues of the organization aggregated $64,859,618, against $61,788,079 in 1928, a gain of more than $3,000,000. Operating expenses decreased $511,415 despite the net addition of 34,206 customers to the company's distribution lines.

NATIONAL METER HAS NEW LOS ANGELES OFFICE

National Meter Company announces the removal of its Los Angeles offices to 2309-11 East 8th Street. The company is installing complete meter testing equipment in the new and more spacious quarters. J. E. Hosier is manager of the oil meter department of the company.

Measuring Gas Flow *under* Varying Pressures *with the* Chart-Rim Planimeter

By T. F. Falls
*Brown Instrument Company**

THE effect of a varying pressure on the measurement of the flow of gases with head or dynamic meters has been previously discussed before this Association, and in many other papers. Briefly, errors are introduced due to the fact that a given rate of flow will cause a variety of differentials in any one installation, as the density of the flowing medium is varied. In gases, pressure is one of the factors controlling density, and so pressure enters into the calibration of the flowmeter as a factor. Temperature and gravity also have their place, but they are usually uniform enough throughout a 24-hour period that a fair determination of the average does not cause serious errors. On the other hand, pressure changes are frequent, and great.

Making pressure corrections would not be so difficult, perhaps, if it were not for the "square root law," which tells us that the flow in the pipe varies with the square root of the differential, and the square root of the density, or as we have come to think of it: the root of the absolute pressure. That is:

$$Q = C\sqrt{hP}$$

where Q=rate of flow, cubic feet per hour.
C=constant of the installation.
h=differential, inches of water.
P=absolute pressure, lbs per sq. in.

As a proper flowmeter will give us both the differential and pressure records our first attempt would be to determine the average of the root of the pressure, and the total flow as represented by the h curve, multiply them together and by the meter constant, and so determine the true flow. The error of this method can be shown by the following table.

h	$\sqrt{h}$	P	$\sqrt{P}$	$\sqrt{hP}$
4	2	9	3	6
1	1	16	4	4
4	2	4	2	4
9	3	1	1	3
16	4	9	3	12
25	5	4	2	10
	17		15	39

Total integrated=17.

Average $\sqrt{P} = \frac{15}{6} = 2.5$

Flow determined with average $\sqrt{P}$= $17 \times 2.5 = 42.5$.

True flow—Sum of $\sqrt{hP} = 39$.

Error=9 per cent, roughly.

The fault in adding our $\sqrt{h}$ and multiplying by the average $\sqrt{P}$ lies in the wide variation of the value of $\sqrt{P}$. Any method that will reduce the amount of variation of $\sqrt{P}$ over the period of summation of $\sqrt{h}$, will decrease this error. You are already familiar with the method of taking hourly averages of $\sqrt{h}$ and of $\sqrt{P}$, and multiplying them together and by the proper coefficient, which accomplishes essentially this purpose.

The chart-rim planimeter incorporated in the Brown flowmeter adds to this latter method a means of determining equal summations of $\sqrt{h}$, to which visual approximations of $\sqrt{P}$ are to be applied, and substitutes these mechanically determined summations for the visually determined hourly averages of $\sqrt{h}$. Fig. 1 shows the pen which makes the planimeter record at the margin of the chart.

The chart-rim planimeter is a device which takes a reading of the value of $\sqrt{h}$ once a minute, and puts the flow represented into what may be called an adding machine. This operates to count in a quantity proportional to $\sqrt{h} \times 1$ minute, or, in other words, a small integral of total flow, pressure disregarded. When successive readings have added in a certain fixed amount, a cam operates the pen at the edge of the chart, making a short radial line. Thus, on a completed chart there will appear a circle close to the margin, from which a number of short lines radiate, the gap between each successive radial line representing the time required to pass through the orifice a certain flow represented by a fixed value of *summation* $\sqrt{h}$. See Fig. 2. We may accurately call this fixed value of *summation* $\sqrt{h}$, W, when multiplied by the proper coefficient C. There now remains only the determination of the proper average value of $\sqrt{P}$ over the time interval required to pass the quantity W. The planimeter has substituted a true reading of the time required to pass a fixed *summation* $\sqrt{h}$ for a visual approximation of average $\sqrt{h}$ over a fixed time.

In reading the chart. we will determine the average $\sqrt{P}$ for each successive W or group of W's, multiplying them together, and add all the products for the 24-hour period to get our total flow for the day. But, since all the W's are equal, we can simplify this by adding the various averages of $\sqrt{P}$, then multiplying by W. Mathematically, this is more easily stated:

$$W\sqrt{P_1} + W\sqrt{P_2} + nW\sqrt{P_3} + \ldots = W(\sqrt{P_1} + \sqrt{P_2} + nW\sqrt{P_3} + \ldots).$$

The above formula shows also that when we make our approximations for groups of W, we must multiply each approximation by the number of W's in the group.

To read the approximations of $\sqrt{P}$, we may either cut a scale on the "Planimeter Shears" described below, or calibrate the pressure pen in terms of the root of absolute pressure on the already drawn square root chart.

Since we can no longer depend on the time lines of the chart to guide us in making our $\sqrt{P}$ approximations, some device is necessary to indicate the time limits over which we are to work. One suggestion is a pair of "Planimeter Shears." See Fig. 2. These are celluloid plates cut to join along the curve of the time line of the chart. At the chart-center end they are drilled the same size as the center hole; and at the chart-rim end, faced off to lie over the radial lines drawn by the planimeter pen. These are very easily laid out by stopping the clock in the meter, fastening a chart in place, and then sweeping the three pens through their normal movements. This way, a pattern for the position of the center, and the exact shape of the edges where the shears lie next one another, can be made. A little thumb tack duplicating the chart hub completes the equipment.

The computer puts the chart and shears over the thumb tack, and walks the shears around the chart, spanning one or more gaps in the planimeter record, according as the rate of change of $\sqrt{P}$ is large or small, reading the average $\sqrt{P}$ at each step. Since every tenth radial line is struck toward the center, let us say he will take groups of two and groups of five, which should be

*Presented before the Southern California Meter Association, February 27, 1930.

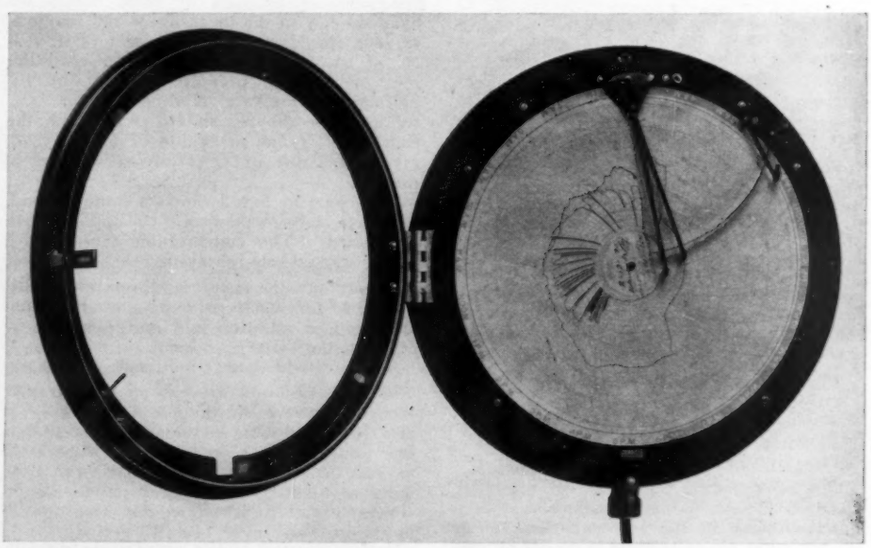


Fig. 1

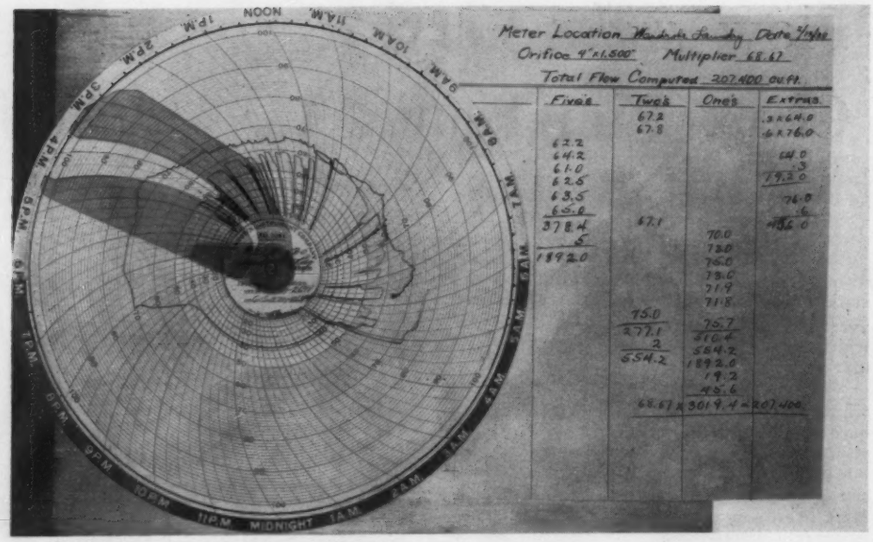


Fig. 2

satisfactory for all but the most extreme pressure records. He will then set up two columns on his paper, one for the "five's" and one for the "two's", and enter each $\sqrt{P}$ reading in its proper column. When the reading is complete, he will add the columns up, multiplying the total of the "five" column by 5, and the total of the "two" column by 2. These products will be added together in their turn and finally multiplied by the already determined value of W. His work is then complete.

The factor W is easily computed from any of the standard formulas. It may be well to outline the process here, for a typical installation, using a pressure pen calibrated in terms of root of absolute pressure on a square root chart. This coefficient depends on orifice size, pipe size, downstream tap dimension, manometer differential, gas temperature and gravity, and the planimeter factor supplied by the manufacturer.

Without taking the time here to develop it, let us use the familiar formula for gas flow:

$$Q = 218.5\ C_v d^2 \frac{T_b}{P_b} \sqrt{\frac{hP}{GT}}$$

where C_v=orifice coefficient
d=orifice diameter, inches.
G=gravity, referred to air.
T_b and P_b are temperature and pressure bases.

For a temperature base of 60°F, and a pressure base of 14.73 pounds per square inch absolute, our formula becomes:

$$Q = 7708.7\ C_v d^2 \sqrt{\frac{hP}{GT}}$$

The conditions of the installation on which the chart shown in Fig. 2 was made were:

Pipe diameter=4.026 inches ID.
Orifice diameter=1.500 in.
Tap connection=2½ and 8 diameters.
Flowing Temperature=60°F
Gravity=0.670
Maximum differential=54.57 inches water
C_v=0.6667

Substituting in the last equation we get an equation for maximum flow as follows:

$Q_{max} = 4578\sqrt{P}$. cubic feet per hour.

The chart is printed with a square-root scale, and graduated 0-100. This automatically cares for our variation in $\sqrt{h}$, so that we can express our chart factor F, in terms of true flow, as read from the differential record:

$$F = \frac{Q_{max}}{100}$$

or $45.78\sqrt{P}$ cubic feet per hour. For a chart graduated 0-100, the manufacturer states that the value of W is

$$\frac{15F}{\sqrt{P}}$$

which gives us a value of 686.7 cubic feet per planimeter mark, for 1 pound per square inch absolute pressure.

The pressure pen on the chart in question is calibrated in terms of absolute pressure, 100 pounds maximum, read as the root of absolute pressure on the square root chart. That is, at full scale the pen reads 100 at a value of 100 pounds absolute. At 90, the pressure value is 81 pounds absolute, at 80, 64 pounds absolute. If we take the square root of the values of absolute pressure at each of these points we have the key to the meaning of the readings 90, 80, etc., for the square root of 100 is 10, of 81, 9, of 64, 8. We can read the root of absolute pressure directly, by dividing any pressure reading by 10. Or, we may use the readings directly from the chart and divide our value of 686.7 by 10, giving a value of Q=68.67 as we are to use it.

The chart in Fig. 2 shows a laundry load, to which this method can be applied with advantage. The computation sheet shown covers the whole operation: tabulation of $\sqrt{P}$ readings, the simple addition and multiplication for each column, and the final operation of addition and multiplication by 68.67 in the "One's" column.

This method has eliminated the uncertain approximation of $\sqrt{h}$, offering greater accuracy where fluctuation is severe. It also promises some convenience in computing total flows by reducing the operation to only one multiplication that cannot be done at sight. Where pressure is also a severe variable, it offers the accuracy of approximation over small periods; and where pressure is almost constant it facilitates speed in computation.

NATURAL GAS IN PROSPECT FOR PANHANDLE-PLAINS AREA

The piping of natural gas to the larger cities from Canyon to Midland, in Texas, and from Post to Muleshoe, Hereford and Farwell, on the Panhandle-Plains area, is the plan of the South Plains Pipe Line Company, an affiliated company of the West Texas Gas Company and subsidiary of the Prairie Oil and Gas Company, according to press reports. The project will embrace approximately 700 miles of pipe lines, the report stated.

Under this program gas will be supplied to Shallowater, Anton, Roundup, Yellowshouse, Littlefield, Amherst, Sudan, Muleshoe and Levelland. From a line being constructed from Canyon, gas will be supplied to Umbarger, Dawn, Hereford, Dimmitt, Nazareth, Friona, Parmerton, Bovina, Farwell, Summerville, Silverton, Quitaque and Turkey.

Since 1927 the affiliated companies have brought gas to Midland, Canyon, Tulia, Kress, Plainview, Hale Center, Abernathy, Monroe, Lubbock, Tanoka, O'Donnell, Lamesa, Odessa, Stanton, Aiken, Lockney, Floyada, Idalou, Lorenzo, Ralls, Crosbyton, Posey, Slaton, Southland, Post and Brownfield.

C. A. LUNDSTROM IS PRESIDENT OF McPHERSON COUNTY O. & G. CO.

At a recent meeting of the stockholders of the McPherson County Oil & Gas Company, of Lindsborg, Kansas, the following officers and directors of the company were elected: C. A. Lundstrom, president; A. M. Ebright, vice-president, David H. Morgan, secretary-treasurer; C. A. Nelson, director; L. McCord Morgan, director. Mr. Lundstrom, new president of the company, had formerly served the organization as treasurer.

The stockholders voted to increase the capitalization of the company to $150,000. The company, organized more than a year ago, has recently moved its offices to the Central Building in Lindsborg.

B. P. STOCKWELL NAMED V-PRES. OF EMPIRE PUBLIC SERVICE

B. P. Stockwell, general manager of the Oklahoma Utilities Company and other properties of the Empire Public Service Corporation in Oklahoma and Kansas, has recently been named as vice-president of the Empire Public Service Corporation, operating properties in 343 communities in 13 states. Mr. Stockwell will continue as general manager of the Oklahoma and Kansas properties, with headquarters at Bristow.

JONESBORO, ARK., TO HAVE GAS ABOUT MARCH 15

Gas will be made available to the city of Jonesboro, Arkansas, about March 15th, according to announcement of the Arkansas Power & Light Company, holder of the natural gas franchise. The new fuel is to reach the city through a lateral constructed from the Louisiana-St. Louis gas line of the Mississippi River Fuel Corporation. Gas will also be supplied by the Arkansas company, from the St. Louis line to Newport, Walnut Ridge, Hoxie, Tuckerman, Kensett, Bald Knob and Searcy.

PACIFIC GAS AND ELECTRIC CO. SELLS MAYFIELD SYSTEM

The gas distribution system in the town of Mayfield, California, has been sold by the Pacific Gas and Electric Company for the sum of $66,936, to the City of Palo Alto. Mayfield recently became a part of Palo Alto.

NEW HOLDER OF B. C. ELECT. RY. CO. DEDICATED

Gas from the new holder of the British Columbia Electric Railway Company at Vancouver, B. C., was officially turned into the company's mains recently by Mayor W. H. Malkin of Vancouver, B. C. Prior to the official ceremony the mayor, members of the city council, and officials made a tour of the new 3,000,000 cu. ft. waterless gas holder and the purifying plant, and were taken aloft in the elevator to the roof of the holder. The party then returned to the governor house, where the ceremony was performed.

It was explained that the new purifying plant and holder are the first units of gas facilities being erected by the company as part of a continuous 15-year gas plant construction program. The second unit will include new wharf, coal handling plant, retort plant, and auxiliary buildings. This unit will be completed by the winter of 1931.

SAN SABA GRANTS FRANCHISE TO CONSUMERS NATURAL GAS CO.

A natural gas franchise has been granted the Consumers Natural Gas Company of Fort Worth, at San Saba, Texas, according to press report. Gas will be supplied through a line from the Jane Ellen field of Brown county. Tap lines from a line which will be constructed to Lometa and Lampasas will supply Goldthwaite, San Saba and Mullen. The Consumers Natural now supplies gas to Brady, Texas, and other towns in that section.

WARRACK ON INDUSTRIAL GAS STAFF FOR COAST COUNTIES

J. B. Wilson, president of Coast Counties Gas and Electric Company, has announced the appointment of James R. Warrack as an industrial gas engineer for that company, with headquarters at Pittsburg. Mr. Warrack will work with K. B. Anderson, whose appointment as industrial engineer for Coast Counties was announced in January.

Mr. Warrack was formerly with the Southern California Gas Company, and is a graduate of the Colorado School of Mines.

E. G. HILL RETAINS POSITION WITH FORD, BEACON & DAVIS

Edgar G. Hill, vice-president of Ford, Bacon & Davis, Inc., whose appointment to the position of vice-president and general manager of Southern Natural Gas Corporation of Birmingham, Alabama, was announced last month, retains his position with Ford, Bacon & Davis, Inc. His appointment with Southern Natural has in no way changed his connection with the engineering firm.

E. H. HARLEY NAMED MANAGER OF DALHART GAS CO.

E. H. Harley, associated with the Dalhart Gas Company for the past two years, has been appointed as manager of the company, succeeding Chauncey W. Smith. Prior to joining the Dalhart Gas Company, Mr. Harley was connected with the Standard Oil Company of New Jersey at Casper, Wyoming.

JACKSON COUNTY LIGHT HEAT & POWER CO. HAS NEW DEPT.

A special laundry equipment sales department has been created by the Jackson County Light Heat & Power Company of Independence, Missouri, with Monta Parrish in charge.

San Francisco Change-Over *to be* Complete *in* 90 Days

STRAIGHT natural gas was introduced into San Francisco, California, Monday, February 24, by the Pacific Gas and Electric Company. It will be served first to the outlying sections and gradually extended from one district to another until the entire city is supplied. Officers of the Pacific Gas and Electric Company estimate that it will take at least 90 days to shift its 183,000 consumers from manufactured to natural gas.

The company has divided the city into 11 districts. Each district will be a unit, and natural gas will be introduced into these units separately. The districts will vary in size from 5,000 to 77,000 consumers.

With the turning on of natural gas in each district, employees of the company will visit each house in the district to adjust burners for use of the new fuel.

According to P. M. Downing, vice-president and general manager of the company, a crew of 800 men will be used for the work, which he estimates will cost about $380,000.

Each consumer will receive a letter three or four days in advance, telling him when he may expect the change-over. He will also be informed of the company's plans by large advertisements which are appearing in the daily newspapers. The letters and advertisements will tell the consumer how to adjust the burners temporarily.

The company is impressing upon the consumers the safety of the new fuel due to its saturation with an odorant of atomized oil manufactured for this purpose. From three to five gallons of this oil are required for every million cubic feet of gas.

The early introduction of natural gas into San Francisco is made possible by the fact that the second natural gas line is nearing completion. A branch from Tracy to Milpitas will tie in with the Kettleman Hills-San Francisco line completed last year. This branch will be completed before the entire city is cut over, and will give San Francisco two sources of supply.

The Pacific Gas and Electric Company plans to adopt the same procedure in the introduction of natural gas into Oakland, work on which will begin Monday, March 3. The entire Eastbay territory will be divided into 18 districts, and 98 days will be required to shift the appliances of the 145,000 consumers from manufactured to natural gas. The change-over has already been made in San Leandro and Richmond.

J. J. DELANEY LEAVES TEXAS FOR WEST COAST

J. J. Delaney, for several years superintendent of measurement for the General Petroleum Corporation of California, and until recently with Westcott & Greis, Inc., in the Houston territory, left Texas on February 15 to become general sales manager for the Reliance Manufacturing Company of Alhambra California. Mr. Delaney will also be affiliated with Westcott & Greis in the San Francisco and the Pacific Northwest territory.

J. J. Delaney

Shortly before leaving California for Texas, in August, 1929, Mr. Delaney was elected president of the Southern California Meter Association, an office which it was necessary for him to resign due to his change of residence.

PAC. NORTHWEST PUBLIC SERVICE COMPANY REPORTED FORMING

In connection with the Central Public Service Corporation's purchase of the stock of the Portland Electric Power Company and a substantial portion of Seattle Lighting Company preferred stock, news reports from the Pacific Northwest late in February credited Franklin T. Griffith, president of the Portland Electric Power Company, with the statement that the name of his company will be changed to Pacific Northwest Public Service Company at the annual meeting of stockholders in Portland, March 12. It is understood that the Pacific Northwest Public Service Company will act as operating subsidiary of Central Public Service Corporation, furnishing light and power in Portland and some 75 communities in western Oregon, and conducting gas service in Seattle, Washington. As a part of the plan, practically all of the stock of the Seattle Lighting Company will be acquired by Pacific Northwest Public Service Company, an issue of $16,000,000 of 6 per cent debentures having already been sold for this and other purposes.

SOUTHWESTERN PUBLIC SERVICE ASS'N CHANGES PROGRAM

Executives in the several branches of the public utility industry of the Southwest, hitherto combined in the membership of the Southwestern Public Service Association, at Dallas, Texas, have determined on a plan which it is believed will considerably reduce overlapping Association activities, without interfering in any way wth the requirements of the companies and the industry. For the present, all conventions and similar activities of this Association are to be suspended, and the organization will be continued with the present secretary, E. N. Willis, in that capacity. However, Mr. Willis announces that he will become executive secretary of the University Club of Dallas.

LOS ANGELES GAS & ELECTRIC REPORTS 1929 GAINS

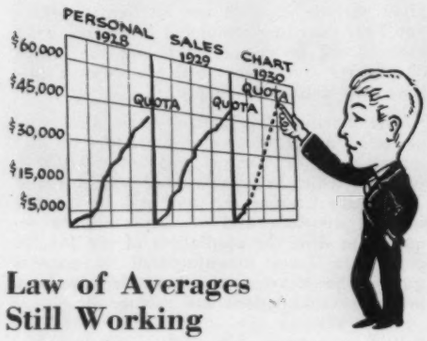
Los Angeles Gas & Electric Corporation, with headquarters in Los Angeles, California, reports a net income for the 12 months ending December 31, 1929, of $5,832,708.95, representing an increase of $915,171.75 over the previous year.

RALPH G. HUBBARD IS NAMED DEVELOPMENT COMMISSIONER

Announcement has been made of the appointment of Ralph G. Hubbard as industrial development commissioner for the Denver District of the Cities Service Company. Mr. Hubbard is staff engineer for the Public Service Company of Colorado.

SALES WRINKLES

"He Gains Wisdom in a Happy Way Who Gains it by Another's Experience" . . PLAUTUS



Law of Averages Still Working

"THE hardest job a salesman has is to keep up enthusiasm." This was the statement which J. W. Peacock offered in submitting one of the best wrinkles which has yet been entered in this department of *Western Gas*. Every salesman can supply an unfailing stimulus to greater effort by the simple expedient of analyzing his own sales work over a period of time, says Mr. Peacock, who for the past two years has kept an absolute record of all calls, sales, and total value of merchandise sold by him. The result of this personal sales record is an inspiration to anyone who is willing to put in the effort necessary to make a large number of sales contacts. Here is the way it worked out for Mr. Peacock during 1928 and 1929:

1928		
Calls	*Sales*	*Amount*
2546	368	$50,753.00
6.91	1	137.91
1929		
Calls	*Sales*	*Amount*
3389	401	$55,574.88
8.45	1	138.59

Analyzing his 1929 showing, Mr. Peacock has it figured out that each call has averaged $16.30 in merchandise sold, representing a commission of $1.47 to him. And the old truth that more calls mean more sales is inescapable, even though the ratio of sales to calls may not always hold exact.

Keeping a close record of individual sales does not call for a complicated bookkeeping system. In this connection Mr. Peacock contributes his experience:

"I find the best possible form is a year date book. In this book I am able to keep a record of every call every day. The Sunday sheet of this book enables me to recap my week's work; also to keep a record of prospects for different pieces of equipment, designating each type of appliance by a key letter."

To serve as a further incentive to continuous sales effort Mr. Peacock sets himself an individual quota, independent from any "bogy" established for him by his company. Of personal quotas he says: I estimate my quota about 60 per cent higher than set by my company, realizing that a large quota, within the realm of possibility, will mean a star to shoot at and keep me interested for the year. Since setting my first quota I try to raise the same quota 10 per cent each year. In 1928 I set a quota of $50,000 total sales, which mark I exceeded. In 1929 I set a quota of $60,000, which I did not make, and I am shooting at the same figure this year. Quotas should be made up carefully, after checking your sales work over a period of years."

The way such a practice of checking up on personal sales work can react on daily selling is best described in Mr. Peacock's own words:

"When I realize that even though I fail to make a sale at every call, I do average $1.47 for that call, I can come out of every house whistling, and when slack periods come I can keep up enthusiasm and build future sales."

—J. W. Peacock

Your Sales Wrinkle May Be Worth $10

TEN DOLLARS may not measure the actual value of the "wrinkle" which is helping YOU to get the names on the dotted line. And yet, some gas appliance salesman may put your idea to work in his territory. You are no poorer. He is richer. Through this Sales Wrinkle forum conducted each month in these pages you may benefit in like manner. Send sales wrinkles to WESTERN GAS at the publication offices, 124 West Fourth Street, Los Angeles, California. Anyone in the gas industry (salesman, sales executive, or employee in other company department) may submit sales wrinkles, one or more, and $10 each will be paid for those published.

Wrinkle contributors this month are:

J. W. Peacock, Southern Counties Gas Company, Santa Monica, California.

A. W. Young, Pacific Gas and Electric Company, Oakland, California.

Frank S. Shell, Southern Counties Gas Company, Santa Monica, California.

Follow the Iceman—New Refrigerator Sales Game

LAST spring when the Southern Counties Gas Company's Santa Monica District started to merchandise gas refrigerators, it seemed necessary for the sales force to begin developing prospects by the cold canvass method—for our public was not yet gas-refrigerator-conscious. Salesmen are always on the watch for something to bolster up a "cold turkey" canvass, and this is the wrinkle which the writer found particularly useful:

An ice card hanging in the window or on the outside wall of any medium priced or fine home was accepted at its face value as belonging to a gas refrigerator prospect. Every such card said plainly, "The people who live here realize that refrigeration of some sort is necessary and desirable." Better refrigeration, at less cost—plus many other merits of gas refrigerator equipment—should have an appeal in such homes.

One morning I called at 10 homes at which ice cards were displayed and from these 10 contacts I found one prospect definitely decided on buying gas refrigeration—from another company. Another had placed an order for an electric refrigerator to be delivered the following day. Two days later I chanced to pass the home of the latter and was surprised to find that the ice card was again in the window. I called and the lady told me the company was unable to deliver the model she had ordered for two weeks. I quickly made an appointment for her to visit our display floor and see the gas refrigerator, after which she cancelled her order with the competitor, inasmuch as he could not fulfill her order, and purchased a gas refrigerator.

I believe that one-third of our refrigerator sales can be gotten from the ice card lead, as the number is great and with this class of prospects the salesman gets a chance to tell his story of gas refrigeration before the competitor has had a chance to make contact. My own experience bears out the belief that we may reasonably assume any medium priced home or any fine home which displays an ice card to be an excellent prospect for gas refrigeration.

—Frank S. Shell.

This Company Finds Royal Road to Sales

REAL prospects are the life blood of a sales organization. It is common practice with many gas companies to maintain a prospect department, which is charged with the task of developing, sifting, relaying and following up prospects from the time they originate until they are finally assigned to salesmen.

The most prolific source of prospects consists of the non-sales members of the company, and the task of keeping this source from depletion, both in interest and quality of leads, is one which merits attention and

calls for originality. Prospects can be paid for, but unless the whole employee body is kept stirred up and at a high pressure, the flow of prospects drops off.

A very successful contest was staged in the East Bay Division of the Pacific Gas and Electric Company, and interest kept red hot among the large force of non-sales employees who contacted the public, through a *Queen* contest. A queen was chosen by popular selection from each department in the Division. This Queen, through personal magnetism, popularity and appeal to departmental pride, aroused the group of employees under her leadership to the sustained and deliberate search for prospects. Each prospect was brought in to the Queen, who turned it over to the Sales Department. The facts pertaining to each name so listed were written up by the Queen. The salesman knew the source of the prospect, the occasion of taking the prospect's name, the ability of the prospect to purchase, and his attitude or frame of mind on the subject. A word was added, if possible, on whom to call for help, if help was needed to close the sale.

For the 10 Queens, there were five major prizes and five secondary prizes. The major prizes were to be awarded to the five highest recipients of votes, based on the number of prospects submitted by the Queen's following. The secondary prizes were given to the remaining five Queens, irrespective of standing in votes. They were all of the same amount, thus assuring everyone who worked of some recognition for her services.

The contest lasted eight weeks, and 111 direct sales were traceable to prospects secured via the Queen route.

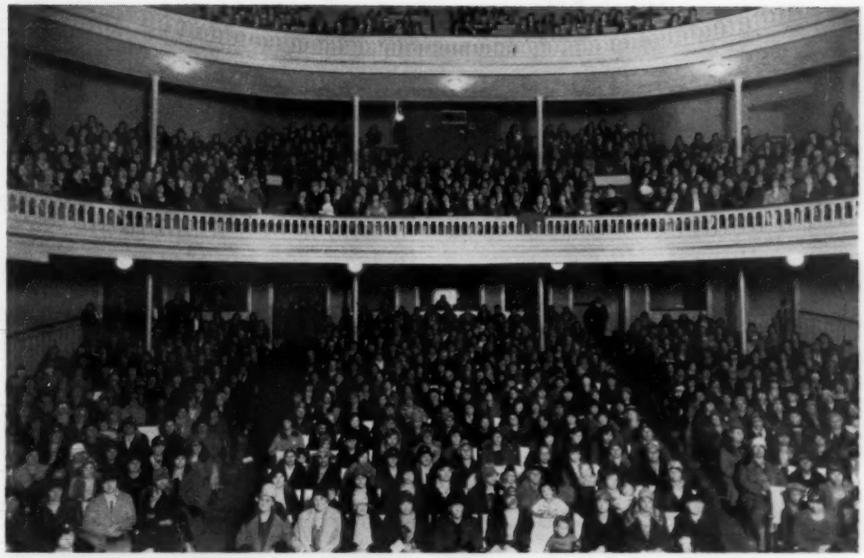
—A. W. Young

FORT WORTH GAS CO. HAS NEW BUSINESS DEPT.

Wesley F. Wright, general manager of the Fort Worth Gas Company, has announced the forming of a New Business Department by his company, which will be operated under the direction of E. C. Whitcomb, recently appointed as new business manager. Mr. Whitcomb was formerly connected with the Eriez Stove and Manufacturing Company.

W. A. RHEINOLD ESTABLISHES RECORD IN APPLIANCE SALES

W. A. Rheinold, salesman with the Wyandotte County Gas Company, of Kansas City, Kansas, established a statewide record for the sale of gas fired laundry equipment, with a total of 294 pieces sold during the year. This record makes Mr. Rheinold champion for the state of Kansas in a contest conducted by Hurley Machine Company. Prizes included an engraved loving cup and $250 awarded by the manufacturer.



This theater auditorium overflowed for Arkansas Valley Gas Company's 1929 cooking school, which drew a total attendance of 4000 in the four-day session.

Cooking Schools Aid Arkansas City Company's Sales Program

By J. G. Mawson

Manager, Arkansas Valley Gas Company, Arkansas City, Kansas

ONCE each year, for the past four years, the Arkansas Valley Gas Company has conducted a cooking school at Arkansas City, Kansas. Home makers of the city have come to look forward to the event, and the school is assuming more importance as an adjunct to the company's sales promotion program each season.

The cooking school held last November, from the 12th to the 15th of the month, inclusive, was by far the most successful one that has ever been put on by the company, both from a standpoint of community interest and attendance. There was a total attendance of 4,000 for the four-day session.

An outline is here offered of procedure followed in staging these schools, which are held in cooperation with a town newspaper.

The newspaper sells space to various firms whose merchandise is used in the school, which includes furniture, stoves and ranges, dishes, cooking utensils, cooking ingredients, linens, house dresses, shoes and what have you. Each firm uses space, which is prorated by the paper according to the value of the item used in the school. Therefore every firm does not take the same amount of space, but each does pay its regular contract rate, there being no additional charge for the extra service. The leading merchant in his particular line of merchandise is selected.

A theater is rented for the four sessions, which take place in the afternoon. The instructor prepares the several dishes before the audience, giving instructions as she proceeds. The stage is set to represent two rooms, kitchen and dining room and each is complete in every detail.

At each session of the school a list containing recipes of the dishes the instructor prepares, and many others in addition, is given to each lady attending.

At the close of each period a drawing is made and the lucky numbers receive the various dishes that have been prepared that day.

There is also a question-and-answer period from a question box.

As each woman enters each day a slip of paper is given to her. We will call this a ballot, which is divided into squares, with the name of everyone represented in the school printed in a square. Each person attending writes her name in each square and deposits these votes every day after the school is adjourned in a ballot box placed in the various stores. On the last day of the school all of these ballot boxes are brought to the stage and a drawing is made. The lucky name drawn, if that person is present, receives a prize from the store from whose ballot box her name was drawn. This prize, which varies in value, is arranged by the advertising department, the advance man of the school, and the firm which is represented at the school. This prize award is not at all compulsory, but in nearly every case has been a part of the school program.

The instructor, an assistant, and an advance man are furnished by an outside firm, which also arranges for the foreign schedule of advertising for the paper.

Gas being the most ideal cooking fuel, and the Arkansas Valley Gas Company being the leading merchandise store for gas appliances, it follows that the gas company receives the lion's portion of the advertising done at these schools. In each school that has been held here the gas company has always furnished gas ranges which were taken to the theater and connected up on the stage free of charge. At the last school to which we are referring, in addition to the gas range for the kitchen which was arranged on the stage, we provided gas heating equipment for the dining room. There

was a new two-tone Moore's Puritan heater along with a Humphrey radiant fire, which represented an ideal heating set-up for the small home.

Each day the instructor gives a talk on the range and why the particular range shown bakes better than some competitive model on the market. The Arkansas Valley Gas Company has cooperated with the Arkansas City Daily Traveler each year in putting on these schools, from which we have received very good results. During the last school there were a number of ranges sold, resulting directly from the advertising received at this school, and the appliances used on the stage were sold to women wanting those particular appliances.

Sales Methods *for* Use *on* Hotel *and* Restaurant Prospects

(Continued from Page 30)

cause it is a proven fact that water backs consume gas; it is a physical impossibility for cold water to circulate through the pipes without lowering the efficiency of the range.) The water back question was brought up because, at the time, their hot water supply was not adequate. An investigation was made and the following conditions found:

The water was drawn from the main through the water back and then deposited in a 150-gallon tank where it was brought up to a temperature of 140° by a multi-coil storage heater and drawn through a six-gallon automatic water heater. With all this arrangement the water supply was not sufficient and at times caused considerable inconvenience.

It was recommended that when the ranges were changed to gas this water heating system be replaced by a small direct fired boiler connected to a 220-gallon insulated tank. The following results were obtained: The gas bill was formerly about $75 and the coal bill averaged $50 a month. Since the installation of the gas ranges and the water heating system the gas bill has remained about the same. In other words, there is no increase to the company, but we have made a real friend and gas booster. The consumer is well pleased with the gas ranges and now has an abundance of hot water. Although there was no increase in revenue here, we have profited and will continue to do so. Since the installation the college has been figuring on gas heating, and also, through its recommendation we have installed a similar water heating system in St. Paul's School.

Now we come to the question of broilers. This is one, no doubt, to which nearly every hotel and restaurant gas man has given serious thought, as nearly all chefs, managers, etc., are imbued with the idea that charcoal broils better meats. This, I believe, after an intensive study, to be a mistaken idea. Nearly all first class chefs agree that the reason for broiling meats is to hold the juices and at the same time eliminate the disagreeable fats and greases. This was almost impossible to do on the gas broiler because of its being fired from the top and thereby causing the juices to drop out of the meats. Of course gas can be used very successfully if the chef will take time to sear his meats before putting them to broil, but this only means more work and does not seem to hit the right spot. It is not practical to put the burners below the meats because of the grease, etc., clogging the burners.

The Vulcan Radiant surface Broiler, recently placed on the market, is designed to meet this need. It is operated by three radiant speed burners, which become red hot and project a heat of 1300°. This broiler was experimented with for some time and was in service in some of the larger hotels in the east for about two years before being placed on the market commercially. The hotels, where they were put on trial, have since purchased them and the chefs speak very highly of their work; so no doubt this will open up a large field for gas revenue.

I have no data on the number of restaurants that are using charcoal broilers, but it is safe to estimate that out of every 100 San Francisco commercial kitchens that do broiling, 99 use charcoal. The cost of charcoal for the average restaurant runs from $30 to $60 per month. This same work can be done with gas at a saving of about 40 per cent. This is a piece of business to which every gas company should give consideration. Any company which has developed a successful plan for getting this business can benefit the industry by passing it along to the other fellow.

With the advent of natural gas in the lines of the Pacific Gas and Electric Company it should be but a short time until the majority of the hotels and restaurants now using other fuels will be using gas.

F. H. BIVENS BACK AT DESK AFTER OPERATION

F. H. BIVENS, president of the Pacific Coast Gas Association, and vice-president of the Southern Counties Gas Company, with headquarters in Los Angeles, California, is back at his desk following a major operation for appendicitis. His many friends in the industry will welcome the word that his health appears to be better than for many years, and that in addition to quickly picking up his regular work, he is again immersed in affairs of the P. C. G. A. in his capacity of president. He attended the Los Angeles meetings of the Technical Section, February 20 and 21, and is busy with plans for the Seattle meeting and the 1930 convention to be held in Pasadena during September.

F. H. Bivens

Presenting *the* Merits *of* Group Appliance Sales

(Continued from Page 34)

When an automatic storage water heater is purchased with a gas range, the cost of the water heater is approximately 35 per cent of the retail price of the water heater sold singly. This same plan also applies to the purchase of a gas incinerator with a gas range.

If the group purchase consists of a house heating installation, water heater and incinerator, the customer can save 25 per cent of the total sales price these appliances would bring when purchased singly.

To the price of a gas range we add only $5 for a $15 radiant heater, and we grant a discount of $10 on any higher priced radiant heater selected if purchased with the range.

These groups are listed here only for the purpose of illustration, for there are any number of groups which can be worked out, applying the same principal. Our terms are, on two appliances, five per cent down and balance 18 months; three appliances or more, five per cent down, balance 24 months. Our usual cash discount of five per cent is used.

It is the usual policy of gas companies to sell gas ranges with a large margin of profit. In the group plan the gas range profit can be used in making the group attractive. Applying a part of the profit, therefore, from the gas range sale to the loss of profit on the water heater or incinerator, a very attractive price on these appliances can be worked out. The profit will be small, but the increased volume will offset the narrower margin.

While we have emphasized the question of price, we must not overlook the fact that salesmanship of the right kind is necessary to make any plan successful. It is our view that, if the salesman properly presents and sells the customer on the merits of appliances offered under the group plan, he will have little difficulty in overcoming price arguments which may be brought up due to the price and payment features of the group plan.

It has been our experience that the group plan of selling has enabled us to place on our lines with reasonable selling effort, such appliances as storage water heaters and incinerators in numbers never before achieved by our organization. All gas men well know that the sale of automatic storage water heaters and incinerators has been a difficult task, and the greatest selling efforts have been made with a view to securing a larger volume of business on these appliances. In our organization, by coupling water heater and incinerator with a gas range or house heating installation and offering a large discount on these appliances in group, a most attractive proposition is made to the customer and the public is being won to these conveniences. It will probably be of interest to know that two and a half times the number of water heaters have been sold by our organization last year than was sold the previous year, due to the fact that we joined the water heater in group with house heating equipment and other appliances and made prices attractive.

It is our belief that through the group selling plan greater success will be obtained than where appliances are sold singly. Through the method described, we are able to pass on to our customers better values than were before possible. We have the opportunity to lessen distribution costs and thus give the customers the benefit of savings which are really great. It has been our policy to give our customer-public the greatest value in gas appliances for a dollar that

it is possible to secure. We are rendering a real service to our customer when we make it possible for him to equip himself at one time with all the necessary, modern, efficient appliances. He receives thereby the maximum in gas service, and the gas company enjoys the benefits from the maximum use of its product. It is our view that gas company selling organizations can more rapidly do the job assigned to them through the use of the group selling plan, and it will be one of the best means of winning the public.

NATURAL GAS CORP. LTD. TO ASK CALIFORNIA FRANCHISES

On November 23, 1929, the Natural Gas Corporation of California, Ltd., placed before the California Railroad Commission a plan to serve liquefied petroleum gas to consumers in a number of northern California towns. According to Reginald L. Vaughn of San Francisco, attorney for the company, an application will be filed with the Railroad Commission on March 19 requesting a certificate of public convenience and necessity to serve 38 communities in California. Butane plants will be constructed and operated by the corporation, according to present plans.

PORTLAND GAS & COKE CO. MAY SERVE ALBANY AND CORVALLIS

Portland Gas & Coke Company, with headquarters in Portland, Oregon, plans to extend its main to Albany and Corvallis from Salem. The company purchased the Salem Gas Company in 1929, and constructed a line from Portland to Salem. Neither Albany nor Corvallis is served with gas at the present time.

PACIFIC GAS AND ELECTRIC CO. BUYS TRACY GAS CO.

Pacific Gas and Electric Company, with headquarters at San Francisco, California, has been authorized by the State Railroad Commission to purchase the outstanding stock of the Tracy Gas Company, at Tracy, California, from H. M. Bardt, owner. Purchase price was named at $119,550.60.

$100,000 TO BE SPENT AT MARSHALL, TEXAS

Approximately $100,000 will be spent in Marshall, Texas, by the Dixie Gas and Fuel Company in making improvements to its gas system, according to recent news dispatches. Half of this sum will be spent in the near future. The laying of about 17 miles of main is included in the expenditure.

C. C. CRAM MAKES NATURAL GAS SURVEY FOR TEEPLE

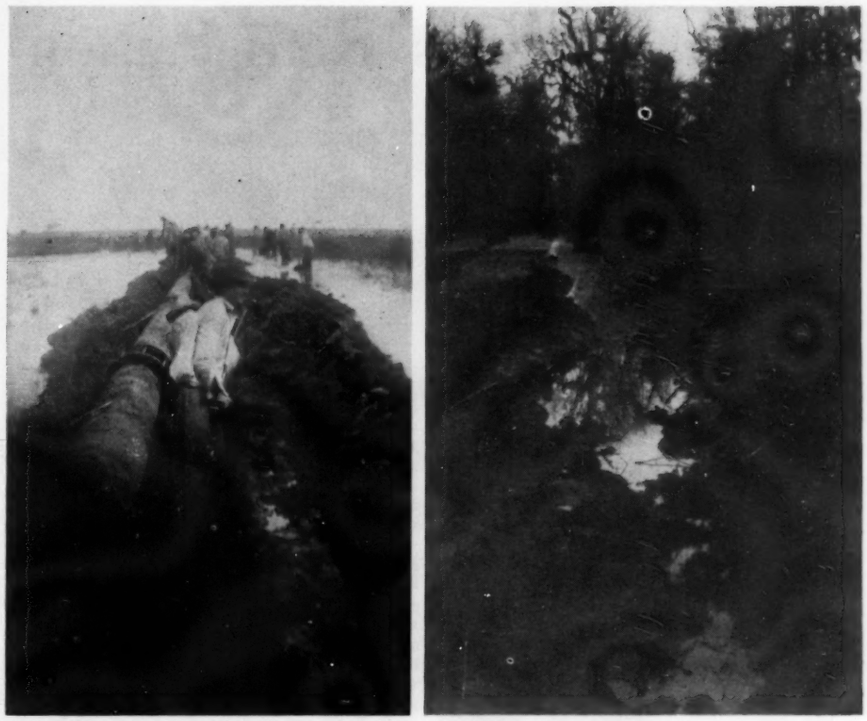
Charles C. Cram of the L. R. Teeple Company of Porotland, Oregon, manufacturer of thermostats, pressure regulators, hot water regulators, and other automatic control equipment, is making a survey of natural gas developments in California for his company.

PACIFIC GAS RADIATOR ADDS TO L. A. PLANT

Pacific Gas Radiator Company of Los Angeles, California, has finished an addition to its plant, incorporating 12,000 feet of floor space. The addition brings the total floor space to 70,000 feet and the capital invested to $350,000.

KULP TO MANAGE AT SALT LAKE FOR INGERSOLL-RAND

C. Stanley Kulp, sales engineer for the Ingersoll-Rand Company at San Francisco since 1921, has been appointed to the managership of the Salt Lake City office of the company, effective February 1.



Construction crews of the Houston Pipe Line Company battled for four months with wet weather conditions, laying the company's 13-mile line from Boling Dome, Texas, to Long Point.

Long Point Line Puts Construction Crews *to* Test

THE Houston Pipe Line Company has recently completed the construction of a 13-mile strench of 12¾-inch gas line from Boling Dome, Texas, to Long Point, where gas is to be supplied to the new sulpher mining plant of the Texas Gulf Sulpher Company which has been under construction for several months.

The completion of the 13-mile line brings to an end what is termed by Frank W. Kirk, general manager of the pipe line company, "A winter-long fight with mud and water". Two weeks of fair weather would have sufficed for the task, which required four long winter months for completion.

The construction crew was forced in digging trenches for this line to throw up levees on each side of the line, to pump water out of the trench with hand pumps and then to tediously move in the pipe, joint by joint. It was nearly always necessary to use four mules in the handling of a single joint of pipe.

Equipment, tractors, caterpillars, trenching machines, were most of the time bogged in the mire, sometimes nearly out of sight.

The most difficult part of this job was a 10-mile stretch east of the East Bernard River. For weeks the linesmen were unable to get on the right-of-way. Even when they could, the ground was water-soaked, and almost every foot of it was a virtual swamp.

The construction crew was under the direction of the construction foreman, Joe Worth, and P. J. Manning.

The new plant of the Texas Gulf Sulpher Company at Long Point is somewhat smaller than the huge plant of the Texas Gulf at Boling Dome, which is also served gas by the Houston Pipe Line Company, but is equally as modern in its fittings, power and equipment, according to Mr. Kirk. Boilers will be fired up in the new plant sometime early in March.

HOUSTON GULF STOCKHOLDERS TO BUY UNITED GAS CO. STOCK

United Gas Company of Houston has recently extended to minority stock holders of the Houston Gulf Gas Company, permission to exchange each two shares of this stock held for one share of United Gas Company common stock. Sixty-four per cent of the common stock of the Houston Gulf Gas Company is held by the United Gas Company.

SOUTHERN COUNTIES REPORTS OPERATING REVENUE FOR 1929

Southern Counties Gas Company, with headquarters at Los Angeles, California, reports a gross operating revenue of $7,997,-407.48 for 1929, as compared with $7,167,-086.77 for 1928. Net operating revenue for 1929 was $1,782,284.47 as compared with $1,910,037.24 for 1928.

ICE USED INSTEAD OF PONTOONS IN MISSISSIPPI INTALLATION

Prairie Pipe Line Company recently effected a considerable saving when it laid 14,000 feet of 8-inch gas line across the Mississippi River at Fort Madison, Iowa. Ice a foot in thickness, made it possible to do away with the usual method of laying lines on pontoons.

Pioneering Gas Refrigeration

As Reviewed by Carl George Munters

By GEORGE H. FINLEY
Managing Editor, Western Gas

GAS refrigeration in the comparatively few years it has been with us, has attained a high place in the estimation of the industry, and is fast winning its way in popular favor. From the first, it has been accepted as a symbol of that romance which is invaluable when identified with an industry in the public's consciousness.

Because it has so thoroughly established itself, gas men may perhaps forget some of the pioneering steps which brought the gas refrigerator to realization. The phase of gas refrigeration pioneering of which the industry in America knows little is that which was fought out in the practical laboratory, when the present refined domestic unit was only a vague conception in the minds of a few scientists.

Carl Munters

One of the men who blazed the trail for gas refrigeration is now in the United States. Carl George Munters, co-inventor of the Electrolux refrigerator, came to this country a short time ago on a combined business and pleasure trip. His presence in person makes it possible to get some sidelights on the early stages of the gas refrigerator which have never been offered to the industry before. In the following paragraphs the writer will briefly sketch in the main skeleton of events surrounding Mr. Munters in his development of the Electrolux gas refrigerator, on the basis of personal background supplied by the inventor.

Refrigeration has been a fetish with Carl Munters, ever since 1918 when his father suggested the field to him as one offering opportunity.

Several facts arise to make us marvel that this particular invention came to light in the surroundings that it did. In the first place, Sweden, which Mr. Munters claims as home, is not the domestic refrigeration market that is found in warmer latitudes. Again, Mr. Munters and his colleagues approached the solution to their problem entirely from a practical angle, knowing little of former experimentation, and retracing many steps before striking a new direction which brought success. It is, in fact, to this practical approach that Mr. Munters ascribes the happy outcome of their work.

Mr. Munters was one of six students chosen to enter the engineering corps of the Swedish navy in the marine architecture branch. Proficiency in this field—one far removed from that of refrigeration—won him the opportunity for advanced study in marine architecture at the Royal University of Technology, in Stockholm, and it is here that we find him in 1918, when mechanical refrigeration first came to his attention as a field of invention. At that time he was 21 years old.

Soon after taking his entrance examination into the Royal University of Technology he got his first taste of the rewards of invention, when he developed and sold manufacturing rights on a self-starter apparatus for automobiles.

In 1919, partly through the income from his first venture, he began to experiment upon refrigeration, approaching the subject at first by the well traveled route of the air compression principle. A hard program of study at Stockholm, with summers taken at sea for his service in the navy, kept the young inventor away from concentrated work, but refrigeration was constantly in his mind. Then in the summer of 1921 one of his professors suggested that he combine his efforts with Baltzar von Platen, a classmate who was taking a mechanical engineering course, and who also was of an inventive turn of mind. He had done considerable work on heat pumps and the professor saw the advantage of bringing the two together on a common project of refrigeration. An exchange of ideas began and as their interests came closer, they concentrated on thermo-chemical processes, exchanging correspondence on phases of this subject in the summer of 1921 when Munters was at sea.

ABSORPTION PRINCIPLE ACCEPTED

Returning to Stockholm for their last year at the Royal University they took living quarters together for the school year 1921-1922 and got down to practical work—always on refrigeration—until they finally settled upon the absorption principle.

The charcoal and ammonia cycle was at first resorted to. A small model was built, in which heat drove off ammonia absorbed by the charcoal. This system was an intermittent one, thermostatic control of the heat being accomplished by a system of balanced weights. Working with the small model, they found that a unit developing sufficient capacity for practical purposes would be too bulky for domestic use. Some months were spent in refining this process to reduce the size of the unit, until the method was abandoned for use of water and ammonia. Patents were here taken out for the first time. The refrigeration cycle now worked by use of valves to equalize pressures between the high and low sides of the process.

Seeing promise of practical success through the absorption principle the inventors recognized the need for more adequate experimental facilities, and sought the aid of a financier. Hugo Tildquest of Stockholm, a distributor of railroad and electrical equipment, though he had had no previous contact with refrigeration, saw prospects in the absorption unit and supplied funds for the experimentation.

Now began a trying period for the young student inventors—school in the day-time, a hard program of school work at night—with every spare moment devoted to the refrigerator. Perhaps the school work suffered somewhat, for it was a common occurrence for them to work the night through on the model, which was housed in their apartment. Four experimental machines were made on the basis of the first patents, all of them slightly different.

It early became apparent that the valves would give trouble. They would work for a time perfectly, until dirt would prevent their seating properly. Then came the thought of getting rid of valves entirely, and producing a refrigerator with no moving parts—a radical departure from all former practice.

SUCCESS NEARS

If this were to be achieved they saw that pressures in the unit must be equalized. They first tried to pass ammonia through a clay plate by osmotic pressure, from the low pressure side to the high pressure. This was too slow entirely, and they experimented with liquid columns. These in turn made the machine too unwieldy in shape and size, because of the long columns necessary. Then came the brilliant thought that a gas could be introduced to serve as the pressure equalizer. This idea marked a turning point. It came in autumn, 1922, and made the difference between success and failure of the absorption principle of refrigeration for domestic use. Research was concentrated on finding the proper gas. The thought of using air was abandoned at once because the oxygen it contained would corrode internal parts. Hydrogen immediately presented itself as a logical medium and the first machine on this principle was constructed—a very bulky affair that could hardly be recognized as the progenitor of the modern unit. About seven feet high by four feet wide, it provided three cubic feet of food storage. However, though it was far from perfect, it met the main test. It worked. A temperature of 13 degrees F. was reached with this machine, the principal parts of which were identical in function to those in the machine of today.

With this first workable model on the absorption principle at hand to point the direction for future work, effort was centered on reducing its dimensions. A liquid heat exchanger was added, and also the "percolator" device or heat pump which is so successfully used in raising the level of the liquid ammonia from the lower to upper generator.

At this point another classmate was engaged by the inventors to draw specifications for an improved model. This man, George Johansson, was originally desired by Munters as an associate in his compression refrigerator research. Although he was at first merely hired to perform the one task of drawing specifications, he is still with the firm which is producing the refrigerator resulting from these investigations, as production engineer in the Motala plant of Electrolux.

POLHEM MEDAL AWARDED

In 1925 the Polhem Medal was awarded Munters and von Platen by the Association of Swedish Engineers for their work with the absorption refrigerator. Along with this merited honor came public notice, and several demonstration machines were exhibited, causing the same type of wonderment which "ice from heat" still creates in the layman's mind.

As the problem of invention yielded to that of production and distribution, the Electrolux interests entered the picture, headed by Axel L. Wenner-Gren, president. Later in the year 1925 Mr. Wenner-Gren came to America with Ernest and Sten Aurell and formed the Electrolux Servel organization which introduced the gas-fired refrigerator upon the American market.

On his present tour through America Mr. Munters is seeing at first hand the stimulus which his and von Platen's work has imparted to gas company sales departments. Reaching the Pacific Coast early in Feb-

(Continued on Page 64)

Clark Resigns Post *with* Oklahoma Natural

E. A. CLARK, connected with the Oklahoma Natural Gas Company, now incorporated under the name of Oklahoma Natural Gas Corporation, since 1917, has resigned his position as general superintendent of distribution for that company to become assistant to H. A. Wallace, president of the Charleston group of the Columbia Gas & Electric Company, at Charleston, West Virginia.

E. A. Clark

Mr. Clark will take up his new duties with the United Fuel Gas Company, between March 15 and April 1. The United Fuel Gas Company is a subsidiary of the Columbia Gas & Electric Company of New York City, operating in West Virginia. The Columbia system embraces gas and electric plants in New York, Pennsylvania, Ohio, West Virginia, Virginia, Kentucky and Maryland.

Mr. Clark is a graduate of Purdue University with the class of 1908, in mechanical engineering. Following graduation he began his work with the petroleum industry at Nowata, Oklahoma.

He later became associated with the Henry Oil Company, in charge of the distribution system and stationed at Collinsville, Oklahoma. Leaving this company he formed a consulting engineering firm with R. S. Shade, later disposing of his interests to Mr. Shade, to go with the American Pipe Line Company, a subsidiary of the American Metal Company of St. Louis, one of the five companies operating gas leases in the Osage Nation.

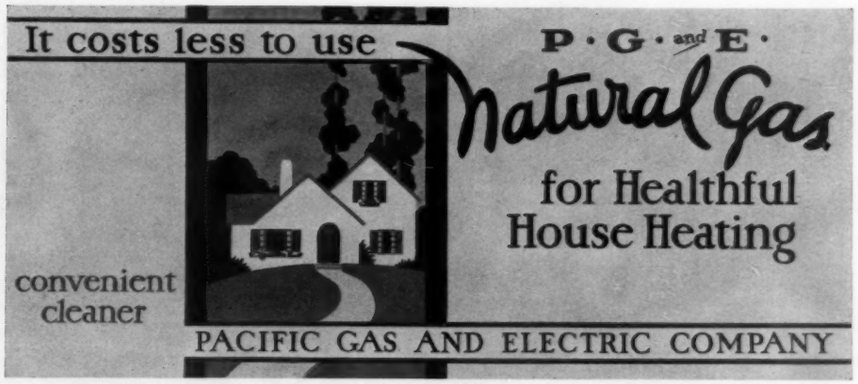
Mr. Clark joined the gas measurement department of the Oklahoma Natural Gas Company in 1917 and at the time of the company's reorganization in 1927 was placed in charge of the gas distribution system, embracing about 55 towns and cities in Kansas, Texas and Oklahoma.

Mr. Clark has been a very active participant in the affairs of the gas industry and has had a large place in originating and disseminating in formation about gas measurement, in which science he is regarded as an authority. For the past few years he has served on the executive committee of the Oklahoma Gas Meter Short Course, held at Norman, Oklahoma.

He also has served as chairman of the Mid-Continent section of the American Society of Mechanical Engineers, and on the executive committee of the distribution division of the Natural Gas Association. Mr. Clark is inventor of several devices used in the distribution departments of gas companies, and has patented a curb box meter top together with several different types of apparatus for taking the gravity of gas.

DUGGINS NAMED MANAGER OF CLAYTON, N. MEX. GAS CO.

O. E. Duggins, formerly superintendent of the Clayton Gas Company, has been named manager, and headquarters of the company have been transferred from Dalhart, Texas, to Clayton, New Mexico. The company also operates a plant in Texline, Texas.



P. G. *and* E. Advertising *to* Reach Local *and* National Prospects

PLANS for an elaborate and all-embracing advertising-sales campaign for the year 1930 have been completed by the Pacific Gas and Electric Company. The message of "Natural Gas, the Cheaper Fuel," will reach not only every actual or prospective domestic and industrial gas consumer in the territory served by this utility, but will be promulgated on a national scale to attract industry to the San Francisco Metropolitan Bay Area.

Entailing an increased expenditure of 40 per cent over that of 1929, the program will include newspaper advertising, poster boards, direct-by-mail advertising, bill stickers, trade magazines, radio broadcasting, and a campaign in selected national magazines.

The local newspaper advertising, in which approximately 51 daily and 97 weekly papers in the P. G. and E. territory will be utilized, is the most extensive feature of the program. The projected plan calls for one advertisement each week in weekly newspapers of general circulation, two advertisements each week in daily newspapers, a natural gas advertisement every other week in all the daily papers in natural gas territory, and merchandise advertisements for special selling campaigns when these are in progress.

A novel feature, and a method of advertising which has never been previously employed by the company, is the poster board campaign. Bill boards featuring natural gas will appear on the highways surrounding the Bay Area. These posters will impress natural gas on the public mind principally as a cheaper, cleaner, and more convenient fuel for house-heating purposes.

In connection with the installation of domestic conversion equipment and the inspection of appliances, a complete procedure is being set up for a direct-by-mail campaign to gas users. At the time of inspection or conversion, the service men secure the names of the consumers, and these names are compiled in a prospect list for the dissemination of literature on natural gas and gas appliances. This direct-by-mail feature of the campaign also ties in with the employee's cooperative plan which has been successfully used for some time. Employees are supplied with prospect blanks to turn in the names of any who evince an interest in gas or gas appliances.

Direct-by-mail advertising will be further augmented by bill stickers. Stickers, calling attention to the economy of the natural gas, will be attached to all monthly invoices to consumers in both natural and manufactured junction with the Pacific Coast Gas Association. This will assume the form of coastwide trade magazine advertisements, radio broadcasting in the N.B.C. Woman's Magazine of the Air every Wednesday morning, and a coastwide postboard campaign.

National advertising, an important item of the company's 1930 program, will be placed in a selected group of national magazines on a whole year basis. National industry will be acquainted with the natural industrial advantages of the San Francisco Metropolitan Bay Area and northern California, and those which will accrue from the introduction of natural gas service.

The advertising program will be carried on under the direction of J. Charles Jordan, Manager of the company's publicity department.

Water Heater Display *at* San Francisco

THE H. R. Basford Company of San Francisco has just held a six-day exhibit at the Palace Hotel, showing the complete line or Ruud water heaters, with a large display of the different working mechanisms. These mechanisms were cut away so that visitors could inspect their construction and operation.

Special attention was called to the Ruud thermostatic moment valve for turning water heaters on and off.

The Ruud Manufacturing Company sent the entire exhibit to the Pacific Coast. Two rooms nearly 100 feet long were required to house the display.

Gas officials were particularly interested in the exhibit of advertising material and the thorough sales plans outlined by the company for use by the utilities in their campaigns. Suggested store and window displays were shown.

Mindful of the fact that the advent of natural gas will bring to the utilities greater opportunity for volume water heating was given an important place in the exhibit, water heaters of varying capacities being on display.

Nearly 500 gas men, architects, engineers and plumbers visited the exhibit, and Mr. Basford expresses himself as well pleased with the results of the effort.

Model Kitchen *on* Wheels Demonstrates Stargas

As part of its plan for promoting Stargas in the suburban communities of Texas, the Stargas department of the Lone Star Gas Company has recently designed and put into operation a truck embodying a model kitchen in which a standard installation of Stargas is used for fuel.

The model kitchen is constructed on a regular 1½-ton Reo truck chassis, and is equipped with standard gas appliances, including a cook stove, water heater, refrigerator, lights, small wall heater and iron. The Stargas installation from which the gas is supplied is mounted on the rear of the truck in a steel cabinet exactly the same as the installation for service in the home. The installation includes two cylinders of Stargas so that when one is emptied, another may be put in without interruption of service.

Hot and cold running water are made possible in the model kitchen through the use of an air tank, carrying from 35 to 40 pounds pressure, built in above the driver's seat, and a water tank built into the kitchen cabinet.

The kitchen floor is laid with linoleum; drapes are hung at the windows; there are drain boards on both sides of the sink; and the entire setting is one in which Stargas can be very fittingly demonstrated. J. Woodward Martin is sales manager of the Stargas Department.

475 Attend Mid-West Regional Sales Conference

More than 300 delegates were registered and attendance was marked at 475 for the Mid-West Regional Gas Sales Conference which convened at Hotel Sherman, Chicago, on February 13 and 14. The Conference is made up of members from Minnesota, Wisconsin, Illinois, Missouri, Iowa, Indiana and Michigan. It was the general opinion of delegates and others attending, that the Conference was the most successful yet held by the Mid-West group.

Sessions opened at 10:00 a. m., with W. R. Evans of the Peoples Gas Light and Coke Company of Chicago, and chairman of the Mid-West Regional Gas Sales Council, presiding. Samuel Insull, Jr., of the Midland United Company gave a talk on "Increasing Sales," and T. P. Pfeiffer of the Byllesby Engineering and Management Corporation presented the subject of "The Promotion of Sales by Regional Advertising." Keith Klevenger, publicity director for the American Gas Association, led a discussion on the value of regional advertising. An address, "What a Sales Department Can Do for a Natural Gas Company," by Fred Karr of the St. Joseph Gas Company of St. Joseph, Missouri, was the concluding feature on the first general session.

The second session opened at 2:15 p. m. with Stanley Jenks of the Northern Indiana Public Service Company of Hammond, Indiana, presiding. H. C. Haroldson, of the Allied Power & Light Corporation of Jackson, Michigan, read a paper on "Selling Central Plant House Heating," followed by another on "Chicago's Conversion Burner Rental Plan," by H. B. Johns of the Peoples Gas Light & Coke Company of Chicago, Illinois.

At 9:30 a. m. on February 14, delegates gathered to hear an address on "Marketing Gas Refrigerators," by M. F. Heslip, of the Public Service Company of Northern Indiana of Hammond, Indiana. C. A. Nash, United Light & Power Engineering and Construction Company, Davenport, Iowa, presided at this session.

A symposium on selling was held following the morning session, and covered the subjects of: "Ranges," led by A. C. Murray of the North Shore Gas Company of Waukegan, Illinois; "Laundry Equipment," led by E. R. Felber, of the Madison Gas & Electric Company of Madison, Wisconsin; "Space Heaters," led by Geo. R. Wilson of the Rockford Gas Light & Coke Company, of Rockford, Illinois; "Incinerators," led by F. C. Hoffman of the Northern States Power Company, St. Paul Minnesota; and Gas Appliance Selling, led by Jack Torbert, of the Wyandotte County Gas Company of Kansas City, Kansas.

F. M. Rosenkrans presided over the closing session at 2:30 p.m., February 4, which featured addresses by Stanley Jenks, on "Domestic Water Heating" and by C. H. Light, of the Peoples Gas Light & Coke Company of Chicago, Illinois, on "Large Volume Water Heating."

P. G. *and* E. Lines Nearing Completion Stage

The major portion of the system for the extension of natural gas into central and northern California by the Pacific Gas and Electric Company is installed. Crews totalling over 600 men working at Los Banos, Manteca, Tracy and Livermore, are rushing the Valley line to completion. The project calls for an expenditure in excess of $26,000,000 and is scheduled to be completed this year, making natural gas with its high heat content and low cost available to practically all consumers of the company.

According to the tentative completion schedule calculated by the company engineers, the line will be completed as follows:

Valley line, to Tracy—May 1st; to Richmond—August 1st; and the Tracy-Milpitas tie-line—May 1st.

Sacramento Line, to Stockton—May 1st; to Sacramento—June 1st.

North Bay Line, to Vallejo—August 1st; to Petaluma—September 1st; to San Rafael—September 1st.

Extensions, to Healdsburg—September; to Napa Valley-Calistoga—December; to Sonoma Valley—October; to Dixon—July; to Modesto—July; to Oakdale—August; to Carmel—March; to Easton-Fowler—March.

New Advertising Program *for* West Coast Industry

(Continued from Page 35)

mailed on request. Some 5,000 of these booklets have already been distributed.

Trade Journals

The new trade journal schedule involves the use of 15 trade journals reaching seven distinct industries, all of them important customers of the gas company. In order to get coastwide coverage in the restaurant field, eight hotel, restaurant and catering publications are to be used. Other industries covered are machinery and metal working, baking, candy making, dairying, laundering, and architecture. Needless to say, this type of advertising would be impracticable for an individual gas company, as it would require the purchase of a great deal of waste circulation. Reprints of all advertisements will be available for the use of industrial salesmen and for direct-mail campaigns to selected prospects.

Outdoor Advertising

The cost of art work and lithography for posters for outdoor advertising is such that this particular field is especially suitable for cooperative action. Accordingly, plans have been made for three separate quarter-showings of one month each in the territory of the gas companies participating in the cooperative campaign. The boards are confined to cities of 25,000 population or more, except that for companies not serving cities of 25,000 population boards will be posted in their principal towns or cities, of whatever size. No highway boards will be used.

The three posters deal with the subjects of water heating, cooking, and house heating. The art work is by an artist of national reputation. The photographs in black and white of course do not do justice to the actual posters in color, but even so they are much more adequate than a wordy description would be, so we rely on the pictures reproduced with this article to tell the story of the billboard "copy."

Each company, *by speaking early enough,* can have its postings on whatever schedule best suits its sales plans. Where no preference is indicated, the following dates will be used:

Water Heating, April 15
House Heating, September 15
Cooking, November 15

Companies which desire to extend the outdoor advertising into territory not covered by the Association's program can do so by making the necessary arrangements with the outdoor advertising firm and by ordering through the office of the Association the extra posters, which may be had at approximately $4.00 each. This will enable the individual company to take advantage of the superior art work and the lithography at cost rates which apply to large scale production.

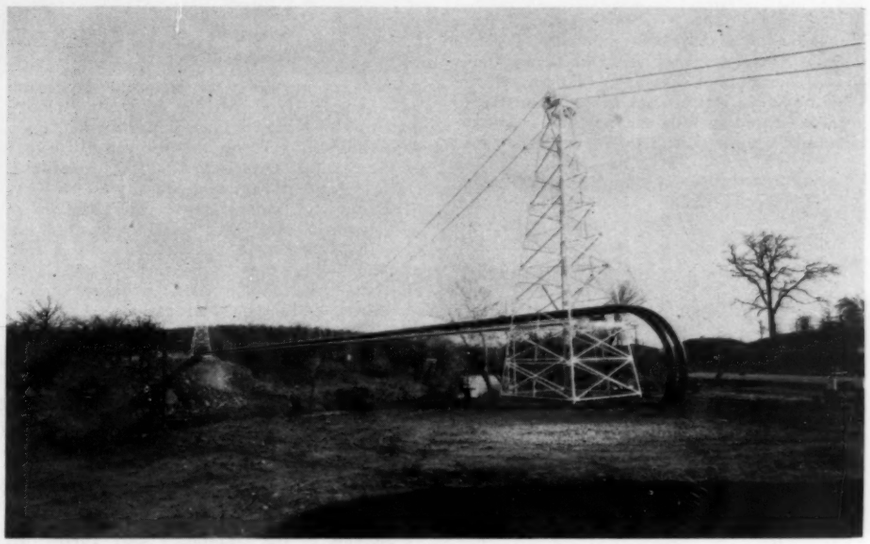
Portfolios and Bulletins

Portfolios describing the cooperative campaign in detail are now in process of production. As soon as ready they will be distributed to a group of persons in the gas industry selected on the basis of their probable interest in the sales end of the business. These will be followed by monthly bulletins which will keep everyone informed as to developments.

Funds for the support of the Cooperative Gas Advertising Campaign are provided through the voluntary pledges of the leading gas companies on the Coast. The basis of support has been set at one cent per meter per quarter. The pledges are for the period of one year.

Support, sufficient to assure the program, has been guaranteed by the following gas companies:

Pacific Gas and Electric Company
Los Angeles Gas and Electric Corporation
Southern California Gas Company
Southern Counties Gas Company
San Diego Consolidated Gas and Electric Company
Santa Maria Gas Company
Seattle Lighting Company
Spokane Gas and Fuel Company.



Suspension Bridge Carries 12-inch Pipe Line

ABOVE is reproduced a photograph of the 340-foot suspension bridge constructed by the Cities Service Gas Company over Bird Creek at Tallant, Oklahoma. The bridge designed by the engineering division of the Empire Companies, and carrying two extra heavy welded 12-inch pipe lines, was constructed for the purpose of eliminating the hazards and maintenance problems of under-water river crossings.

The bridge has a span of 34 feet and carries the pipe lines four feet above the high water mark. The two fabricated steel towers shown on either end of the bridge support two 1⅝-inch steel cables from which is suspended a fabricated steel decking carrying the pipe. A cat-walk runs between the pipe lines. Gas reaches the bridge through the two 12-inch pipe bends, which also act as expansion units for the line during temperature changes.

Construction of the bridge, which was under the supervision of Charles J. Watson, engineer of the gas division and Harry McDaniel, pipe line division superintendent, was completed December 24th.

Lone Star *to* Build 26th Compressor Station

THE construction of a main line compressor station in a new gas field near Brad, Texas, is one of the chief items in a construction program just announced by the Lone Star Gas Company, to begin as soon as weather conditions permit. The company has four wells in the Brad field, and several thousand acres of leases upon which other wells will be drilled.

Several miles of large size gas line, 12-inch or larger, will be laid into this field from a point on the company's main line north and west of Strawn, Texas.

In connection with the Brad field developments the company finds it necessary to construct a large dam for the storage of 20,000,000 gallons of water to be used for cooling purposes. The dam will be built on a branch of the Iona creek. Five or six cottages are to be constructed at the compressor station, which will be the 26th compressor plant operated by the company.

Another field being connected to the Lone Star system is the one located in Milan county, 6 miles east of Rosebud. Three wells have been drilled in this field and five additional wells are to be drilled in the near future. The wells in this field will be tied in to the company's Temple, Texas line near Eddy.

Two 12-inch lines from Petrolia, Texas, to the field at Duncan, Oklahoma, are also to be replaced by a larger line, which will involve the laying of about 62 miles of pipe. Other activities announced include the drilling of wells and construction work in the gas field near Sipe Springs in Comanche county, between Eastland and Brownwood.

VEGREVILLE, ALBERTA, FRANCHISE FOR NATURAL GAS, ASKED

The Vegreville Natural Gas Company of Vegreville, Alberta, has asked that city for a franchise for the service of natural gas. Dr. J. A. Allen, consulting geologist and J. A. H. Church, consulting engineer, are negotiating for the gas company.

Twelfth Annual Convention Due *for* Oklahoma Utilities Association

By O. D. HALL
Assistant Manager
Oklahoma Utilities Association

PUBLIC utility executives and employees from Oklahoma and several other states will participate in the Twelfth Annual Convention of the Oklahoma Utilities Association at Tulsa, Oklahoma, March 11, 12 and 13. Branches of the industry to be represented include the natural gas, electric light and power, telephone and electric railway utilities and manufacturers, jobbers and dealers in gas, electrical and telephone equipment and supplies.

E. F. McKay

All sessions of the convention will be held at the new Hotel Tulsa, and registration is expected to reach or exceed 1,100. General sessions, in which all branches of the industry will participate, will be held in the forenoons and division sessions in the afternoons. The convention sessions will be held on the mezzanine floor and the entire third floor will be utilized for exhibits of gas, electrical and telephone equipment.

The sessions of the Gas Division of the Association on the afternoons of March 11 and 12 will be of special interest to the natural gas industry. Certain features of the general program will also have special attractions for representatives of gas utilities. Included on the general program is an address on the morning of March 12 by B. J. Mullaney of Chicago, president of the American Gas Association, on the subject "What is Ahead of Us." Another speaker on the general program, who will have a message of interest to the gas industry as well as to other utilities, will be F. C. Hamilton, New York, valuation and rate engineer of Henry L. Doherty and Company. He will discuss valuation and rate matters.

Speakers on the Gas Division programs will include H. C. Morris of Dallas, chairman of the Natural Gas Department, A. G. A., who will talk on the subject "Progress of the Natural Gas Industry;" D. A. Sillers, Dallas, general chairman Southwestern Gas Measurement Short Course committee, who will explain the work and objects of the Gas Measurement Short Course; and a talk on "Servicing Gas Appliances," by C. E. Sherburne, Oklahoma City, city plant superintendent, Oklahoma Natural Gas Corporation. Mr. Mullaney will also address the Gas Division.

Among other features of the Gas Division meetings will be moving pictures showing the Oklahoma City oil and gas field, and gas pipe line construction, and talks on "Maintaining Service," "Cleaning Natural Gas," "Purchasing Agents' Problems," "Ways and Means of Promoting Domestic Gas Sales in Natural Gas Territory" and "Problems of the Oklahoma City Field." E. C. Joullian is chairman of the Gas Division of the Association.

Among leading features of the convention will be the annual reception and ball Tuesday night, March 11, annual banquet and entertainment Wednesday night, March 12, and the meeting and public demonstration of the Safety Section of the Association Thursday, March 13. A number of public utility accident prevention and first aid teams will participate in the latter meeting contesting for substantial prizes. Among the teams already entered are several from natural gas companies.

The United States Bureau of Mines will have a display of safety equipment on the mezzanine floor of the hotel.

Coast Counties Near Completion *of* Natural Gas Change-Over

STRAIGHT natural gas is now being served in almost every district of the Coast Counties Gas and Electric Company, and the change-over is being completed as rapidly as possible in all northern California points served by this utility.

The first straight natural gas to be turned into Coast Counties territory was at Hollister on January 7, following in Gilroy the next week. Then commenced the change-over in the great industrial section of Contra Costa County, first at Concord, then Martinez, Crocket, Pinole, Antioch and Pittsburg.

The final change-over in the company's southern division will be at Watsonville and Santa Cruz, giving complete straight natural gas service to the entire Coast Counties territory.

O. F. Anderson, E. A. Chase and R. L. Nance of the Los Angeles Gas and Electric Corporation are heading the school of instruction and the change-over crews for Coast Counties during this change-over period.

A number of additional distribution systems have been laid to bring new communities within the range of natural gas service on Coast Counties mains. In the southern division these new communities include Morgan Hill, with more than 6 miles of distribution system; San Martin with 2.4 miles; the old Mission town of San Juan with 3.7 miles, Aromas and Tres Pinos.

New transmission systems necessitated by the service of straight natural gas in the southern division called for a 10-inch line from the trunk line of the Pacific Gas and Electric Company to Watsonville, a total of 20.3 miles; a 6-inch lateral distribution line from the trunk line to Gilroy, a total of 5.5 miles; 4-inch line from Gilroy to Morgan Hill, a distance of 10.3 miles; 4-inch line to San Juan, 2.6 miles; 6-, 4- and 3-inch lines to Hollister, 1.3 miles; making a total of more than 40 miles.

In the northern division also there have been new distribution systems installed, in Walnut Creek, Danville and Bay Point, calling for 13 additional miles of transmission main from Concord through Walnut Creek to Danville and 4½ miles to Bay Point.

During the change-over a complete record of appliances in each home has been made, to give the company a check of the condition of appliances and an opportunity to replace those which are obsolete, worn out, or in need of repair.

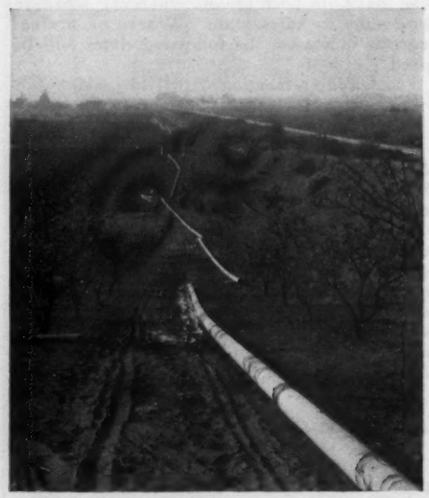
The change-over was made directly from manufactured to straight natural gas, mixed gas at no time being served.

The straight natural gas served by the Coast Counties Company is taken from the Kettleman fields, connection being made with the trunk line of the Pacific Gas and Electric Company for the southern division, and gas being taken directly from the Standard Pipeline for the northern division.

Sanderson and Porter, under the supervision of the Coast Counties Company, have erected stations for the measuring and regulating of natural gas in Watsonville, at the Gilroy Junction, in Morgan Hill, San Martin and Gilroy.

All of the straight natural gas served by the Coast Counties Gas and Electric Company is odorized.

Postal cards were mailed all consumers prior to the change-over, giving proper instructions regarding the use of appliances until they could be adjusted. Immediately following the change-over folders were mailed to all consumers, covering the many questions asked concerning the new natural gas.



Sections welded by firing line, ready for tying in. This view was taken looking toward Watsonville, California, on the 10-inch transmission line of the Coast Counties Gas and Electric Company.

Billboard advertising played a large part in supplementing direct sales work on house heating for The Gas Service Company. The boards shown above were used last year in some of the utility's larger towns.

"Gas Service" Sales Rise *in* 1929

By CHAS. D. GREASON

Director of Advertising and Publicity
The Gas Service Company

SALESMEN for one good sized group of natural gas distribution companies in the Middle-West are making records these days—records that are giving these companies a fine increase in domestic and house heating sales of gas and thereby bringing about a fine increase in domestic revenue.

These are the new business representatives of The Gas Service Company, one of the Cities Service Companies, which operates gas distribution properties in communities in four states: Kansas, Missouri, Oklahoma and Nebraska. This company completed a distribution system in the first town to be served with natural gas in Nebraska, the first of this year.

B. C. Adams, veteran Doherty executive, is vice-president and general manager of The Gas Service Company, the headquarters office being in Kansas City, Mo.

SALES UP 99.6 PER CENT

Figures for the year ended December 31 recently have been compiled by F. M. Rosenkrans, new business manager of The Gas Service Company, showing that the combined departments increased the appliance and installation sales over the preceding year, 99.6 per cent. Total sales for all of the Gas Service new business departments for 1929 amounted to $6,142,952—a fine record for a company with approximately 212,000 customers. Appliance and installation sales amounted to $4,236,081 and securities sales made by the departments during the two customer-ownership campaigns held during the year amounted to $1,906,976, market value.

There was an increase of 25.2 per cent in domestic and house heating sales of gas and increased domestic revenue amounted to 16.9 per cent, comparing 1929 with 1928. The domestic cubic feet sales of gas per customer increased from 65.8 M.c.f. to 73.1 M.c.f. and the annual revenue per customer from $54.01 to $56.08. An increase of 12.4 per cent in the number of customers was reported for 1929, the total number of customers last year reaching 211,930.

HOUSE HEATING STARS

These fine increases shown by the new business departments have been due to the exceptionally good results obtained through the sale of house heating appliances, the departments in 1929 having brought about more house heating equipment sales than were made in the previous three years. The total number of central house heating installations sold during the year amounted to 11,130, this figure including only furnaces and conversion burners. Of this number, 1,400 were gas designed boilers and furnaces, the remainder, 9,726, being automatic gas conversion burners. These figures are the net installations, the returns having been deducted from the gross number sold, and it represents the actual number of central house heating jobs added to The Gas Service Company's lines in the year.

The total number of appliances sold during the past year by all of the company's sales departments was 45,192. House heating appliances sold, besides the central house heating jobs, included 5,226 large capacity space heaters which are used to replace coal stoves, base burners and similar heating apparatus. These heaters are inclosed and vented and have sufficient capacity to heat three or more rooms. The total number of house heating units sold, consisting of all central house heating equipment, large capacity space heaters and major heating equipment, was 16,703. For auxiliary space heating the radiant type of gas heater was used, the total Gas Service Company sales of radiant heaters for the year amounting to 6,233.

During the year 11,634 ranges were added to the company's lines, range sales being carried on by all of the departments at various times during the year.

More storage water heaters were sold in 1929 than in any other year that the new business departments have been operating, 4,822 being sold in 1929.

Much progress was made by the departments in all of the properties in industrial activities during the year. Many new industrial contracts were secured and a total of 1,111 industrial appliances were sold, consisting of large and small burners, broilers, soldering and melting furnaces and water and unit heaters. In the hotel and restaurant field a large amount of new improved cooking equipment, ranges, water heaters, bake ovens, etc., was sold. The total hotel and restaurant equipment sold during the year was 222 units.

The results obtained by the sales department of the Kansas City Gas Company, the largest of The Gas Service Company's properties, is believed to have established an all time record; at least it is a record for any city in the country the approximate size of Kansas City, Missouri. This department, under M. B. Buckley, new business manager, last year sold 6,254 central house heating

B. C. Adams *F. M. Rosenkrans*

plants and 2,363 storage water heating systems, the house heating installations, including central house heating systems only, exclusive of space heaters and room heaters. This is an exceptional record, especially when it is considered that approximately 70 per cent of the central house heating jobs were sold during the last six months of the year.

A REAL INSTALLATION JOB

The company's operating departments in the various cities have all done a splendid job in making installations and in filling all orders a short time after they were turned in by the new business department. For more than six weeks, from the middle of September through the month of October, from 50 to 60 house heating orders a day were handled by the operating department of the Kansas City Gas Company. At no time in the past year was this operating force more than three days behind on installation orders and this was found necessary for efficient operation.

There are a number of reasons for the success enjoyed by the new business department in adding such a large volume of house heating business. It, of course, took an experienced and well trained sales force to put over this big job. Special house heating rates and a number of changes of rate forms in some of the larger cities served by the company have aided house heating sales.

Public confidence in the local companies and the splendid relationship existing between the customer public and the company have also been a big factor.

Salesmen in all of the properties have been aided in house heating sales by a strong newspaper advertising campaign. Advertisements telling the story of gas for heating were run periodically throughout the year, these ads featuring the comfort and convenience of gas heat together with the economical feature, the fact that there is house heating equipment to meet every requirement and that gas heat is more healthful, giving an even temperature day and night. These advertisements were prepared by Ray T. Ratliff, advertising manager of the Kansas City Gas Company, for all of the properties and used at approximately the same time. The smaller properties near Kansas City, therefore, had the advantage of the same ads in the Kansas City papers as well as in their local publications. Billboards have also played an important part in the advertising program in some of the larger cities; Kansas City, Mo., Kansas City, Kans., Topeka, Kans., and St. Joseph, Mo., all of these cities using the same poster at approximately the same time, with monthly changes. Large painted boards also brought results in Kansas City in addition to the value received from a great number of poster boards.

Peak load deliveries in greater Kansas City have shown a big increase due to a great extent to the additional house heating business on the lines. The peak day delivery in greater Kansas City during the winter 1928-1929 was approximately 65 million cubic feet. The peak day during the 1929-1930 winter up until February 1, has been approximately 96 million, this peak day occurring on January 16. Gas served in greater Kansas City includes: Kansas City, Mo.; Kansas City, Kans.; North Kansas City, Mo.; and Independence, Mo.

All of the departments expect to concentrate on house heating equipment sales throughout the entire 12 months of 1930, instead of the last six months, as in 1929. There will be special campaigns on other domestic equipment throughout the year, but house heating will occupy the stage, to be starred every month. A group sales plan for all departments has been worked out by Mr. Rosenkrans by which customers can purchase ranges, automatic storage system water heaters or incinerators at the same time as a furnace conversion burner, at substantial discounts on a group purchase. Two or more smaller appliances also can be purchased at a much reduced price than if purchased at different times. This group plan should prove very attractive and give the company an opportunity to quickly increase the consumption in the home of the customer who is quick to take advantage of this opportunity.

In 1929, on a customer basis, the appliance and installation sales of all The Gas Service new business departments were $19.72, compared with $11.02 on a customer basis for the preceding year.

The new business department of the St. Joseph Gas Company at St. Joseph, Mo., led all of the new business departments of The Gas Service group with sales of $34.62 on a per customer basis.

The department that ranked second on this basis was that of the Western Distributing Company at Eldorado, Kansas, this company operating a number of small properties, in Eldorado and in a number of small towns near that city. Their merchandise sales on a per customer basis were $26.42.

The Joplin Gas Company New Business Department at Joplin, Mo., ranked third with merchandise sales on a per customer basis of $24.79.

The Kansas City Gas Company's average appliance and installation sales of $19.58 per customer is regarded as outstanding, considering the fact that it is most difficult in cities as large as Kansas City to establish sales records on a per customer basis as high as in smaller communities.

Reid Named Vice-Pres. *of* Southern Union Gas Co.

WALTER REID, for the past three years consulting natural gas engineer of Dallas, Texas, has been appointed vice-president and general manager of the Southern Union Gas Company, according to announcement of C. W. Murchison, president of the company, which has headquarters at Dallas. The appointment became effective February 1.

Browne & Browne

Walter Reid

Mr. Reid, during recent years, has made several notable contributions to the oil and gas industry, along technical and scientific lines. He is the inventor of the wide range type orifice meter now in general use in the industry. He is also the designer of the new apparatus, recently adopted as standard by the Natural Gasoline Association of America, the American Petroleum Institute and the Interstate Commerce Commission, for determining the vapor pressure of natural gasoline.

Mr. Reid is the originator of a method of regulating the heating value of natural gas now being used by several leading gas companies. He has also recently published new tables for determining the open flow of gas wells.

His experience with the oil and gas industry dates back to 1916, when he was employed by the Oklahoma Natural Gas Corporation, with which company he was identified until 1921, when he became associated with the Lone Star Gas Company of Dallas, as superintendent of measurement.

Mr. Reid served this company in various capacities until 1926 when he resigned to go into the consulting field. During the past three years he has been retained in the capacity of consulting natural gas engineer by several of the leading oil and gas companies of the country, operating in the Mid-Continent and the Southwest.

The American Society of Mechanical Engineers, American Institute of Mining and Metallurgical Engineers, American Chemical Society, and the American Association for the Advancement of Science, all claim him as a member.

The Southern Union Gas Company, operating from 702 Browder St., Dallas, owns and operates natural gas systems in Texas, Oklahoma, Arkansas, New Mexico and Colorado, and has recently announced plans for the construction of a gas line from the Panhandle fields of Texas to Omaha, Nebraska.

Mr. Reid announces that he will continue his consulting work through the firm of Reid and Bartlett. J. W. Bartlett has recently resigned as superintendent of the Dixie Gulf Gas Company, and as superintendent of the Houston Gulf Gas Company, properties of the United Gas Company of Houston, to become identified with the consulting firm, which maintains headquarters in the Athletic Club building at Dallas.

WEYMOUTH TO SPEAK ON NATURAL GAS AT JOHNS HOPKINS

Thomas R. Weymouth, president of the Oklahoma Natural Gas Corporation, has accepted an invitation to lecture before the School of Engineering, Johns Hopkins University, Baltimore, March 4, according to announcement made by Dr. Wilbert J. Huff, professor of gas engineering.

Mr. Weymouth will speak on "Some Engineering Aspects of the Natural Gas Industry." He will represent the Committee on Cooperation with Educational Institutions of the American Gas Association.

NORTHERN STATES POWER TO HAVE NEW ST. PAUL BLDG.

Northern States Power Company, a Byllesby interest, plans the construction of a new office building at St. Paul, Minnesota. Headquarters of the company are maintaned at St. Paul, with other offices at Mankato, Fairbault and Moorehead, Minnesota.

Mexican population of the lower Rio Grande comprises an important element on the consumer list of the Rio Grande Valley Gas Company. The illustration shows a Mexican fort erected many decades ago, and now housing Mexican families.

Natural Gas Service Grows *in the* Fertile Rio Grande Valley

By R. T. McMinn

Auditor, Rio Grande Valley Gas Company
McAllen, Texas

MANY years ago the Lower Rio Grande Valley of Texas was little more than a long stretch of mesquite, chaparral, and giant cactus, populated chiefly by road runners, Mexican peons and a few scattered white inhabitants. Had anyone at that time predicted that the country would some day become one of the world's garden spots, he would have been considered a little unbalanced. Nevertheless, in spite of the forbidding appearance of the country, some hardy soul experimented with some citrus trees, and his success was so great that the future of the Valley as a citrus producing area was definitely established. As a result of this early experimentation the world has an added citrus and winter vegetable producing area approximately 75 miles long and 20 wide. Rather, this much of the Lower Rio Grande Valley has been proven to be adaptable to the culture of citrus fruits and winter vegetables, and there is untold additional land to the west and north that awaits only the formation of irrigation districts and introduction of sufficient water to make it, too, a fertile producing area.

Several years ago, men interested in the natural gas industry turned their eyes toward the Valley and foresaw the remarkable economic development that would take place there. They decided that the time was ripe for the entrance of natural gas into the drama of inhabitation and upbuilding of the Valley. Accordingly they made their surveys, obtained the franchises and other necessary grants and permits, and started to work laying a gas line from the gas field in Jim Hogg County near Mirando City some 100 miles from the upper end of the Rio Grande Valley. The work was started in the early part of 1927 and franchises were held or obtained shortly thereafter to serve natural gas to Mission, McAllen, Hidalgo, Edinburg, Pharr, San Juan, Alamo, Donna, Weslaco, Mercedes, La Feria, San Benito and Brownsville—all thriving cities in the area, and, with the exception of Brownsville, all are comparatively new.

The first gas was available for use in McAllen on August 29, 1927 and the remaining towns were served at various dates later on, until all towns were enjoying the benefits of natural gas by November of 1927. McAllen had been chosen as the city in which the Valley headquarters would be located, since it was near the upper end of the Valley and in a strategical position in relation to the main transmission line from the field. The total length of the transmission line is 160 miles, and McAllen is located about 60 miles from the lower end of the Valley and 100 miles from the field.

There had to be a great deal of missionary work done, inasmuch as a large part of the inhabitants of the Valley were unfamiliar with the use of gas. Then, too, there are many Mexican families in the Valley—every town having its "Mexicita" or "Little Mexico" where the Mexican families live among themselves with their own stores, places of amusement and the like. They are unfamiliar with any fuel except wood, and are very slow in changing over to natural gas. However, more and more families started to use gas for heat, water heating and cooking, and as they passed the word around to their friends of the advantages of gas the number of consumers slowly mounted.

The one city of the Valley that did not grant the Rio Grande Valley Gas Company a franchise at the very start was Harlingen. In July of 1928 the City Commission finally conceded to public sentiment, and granted the franchise. By the middle of October this town also was being served with natural gas. At the present time there are 14 cities being supplied by this company. There are some 5 or 6 small but thriving communities springing up along the Southern Pacific lines that roughly parallel the string of towns on the Missouri Pacific Railroad already being served, about eight or 10 miles to the north, that are making a strong bid for gas service, and no doubt before so very long these, too, will be supplied with gas.

The Rio Grande Valley Gas Company also handles gas appliances and has enjoyed a nice volume of business in the appliance department.

The Lower Rio Grande Valley, with a climate very similar to that of southern California and Florida, is an ideal country in which to use gas for heat. Cold weather comes at intervals and often with little warning.

There are many industries in the Valley that use gas, some of them being the Central Power & Light Company's main generation

Valley headquarters for the Rio Grande Valley Gas Company, at McAllen, Texas.

plant, pumping plants that supply the irrigation water for the area, cotton gins, cotton seed oil mills, brick yards, canning plants and, of course, the myriad laundries, cleaners, restaurants, hotels, etc.

The number of consumers served by the Rio Grande Valley Gas Company has increased from a few hundred at the end of 1927 to over 7,500 at the present time. There is an almost unlimited field to draw from. It is estimated that there are some 150,000 inhabitants in the entire Valley, although unfortunately many of these people are living on vegetable farms and citrus orchards not adjacent to the present gas system. Then, too, the five or six towns that are situated on the Southern Pacific lines and are not yet served with gas include many of these 150,000 people.

The three largest towns of the Valley, as well as being the ones with the largest number of gas consumers, are Brownsville, Harlingen and McAllen. Harlinger and McAllen are rapidly growing, having almost doubled in size since gas was first introduced in the Valley, and bid fair to increase their number of gas consumers greatly in the next year or so.

Oil Equipment *and* Engineering Exposition

THE Oil Equipment and Engineering Exposition will be officially opened at Shrine Auditorium, Los Angeles, March 17. The doors will be informally opened at noon on Sunday, March 16, and will close on Sunday, March 23.

Members of the board of directors of the exposition are: A. H. Bell, general superintendent, Continental Oil Co.; Ward B. Blodget, assistant manager, Chanslor-Canfield Midway Oil Co.; C. M. Fuller, president, Richfield Oil Co.; L. E. Lockhart, president, Rio Grande Oil Co.; Neil Norris, manager of production, MacMillan Petroleum Co.; and E. G. Lenzner, managing director.

Wendell Jones, of the Petroleum Equipment Co., is chairman of the program committee, which also includes W. H. Laury, Universal Rod and Equipment Co.; Frank Mason, Shaffer Tool Works; Harry Morgan, Blackor Co.; R. R. Robinson, consulting engineer; and H. W. Westsmith, publicity director.

Members of the American Society of Steel Treaters will join with the American Welding Society in presenting a program on Tuesday afternoon, March 18. On March 20 and 21, the production division of the American Petroleum Institute will hold a two-day conference on drilling and production procedure. Wendell Jones and Cy Rubel will be in charge of the program.

Equipment used in the oil and gas industries will be placed on display, and the exhibits will include tools and supplies used in gas and oil production as well as machinery used in gasoline refinery operations.

Equipment that has a special interest for men employed in the gas industry includes a collection of control equipment and regulating devices. The educational value of the display will be increased by the adoption of the cutaway method of showing how and why each piece of equipment operates.

Other exhibits will include several types of valves designed for various uses in the gas and oil industries, and new control instruments for the intermittent operation of gas-lift wells, together with other special devices for gas-lift work

Latest improvements in propane gas regulators will bes hown, as well as absorption equipment and a small type liquid level control for use in natural gasoline plants.

Shrine Auditorium exhibit halls will house displays at the Oil Equipment and Engineering Exposition.

1930 Calendar

Oklahoma Utilities Association—Tulsa, Oklahoma, March 11-13, 1930.

Commercial Section, Pacific Coast Gas Association—Tacoma, Washington, March 21, 1930.

Southern California Meter Association—March 27, 1930.

Mid-West Gas Association—Waterloo, Iowa, April 14-16, 1930.

Arizona Utilities Association, Pacific Coast Gas Association—Joint Conference, Arizona Biltmore, near Phoenix, April 16-18, 1930.

Southwestern Gas Measurement Short Course—Norman, Oklahoma, April 15, 16, and 17, 1930.

Southern Gas Association—Savannah, Ga., April 22-24, 1930.

A.G.A. Natural Gas Dept.—Hotel Roosevelt, New Orleans, Louisiana, May 5-8, 1930.

Canadian Gas Association—Halifax, Nova Scotia, June 24-25, 1930.

Pacific Coast Gas Association—Huntington Hotel, Pasadena, Calif., September 9-12, 1930.

American Gas Association—Municipal Auditorium, Atlantic City, N. J., October 13-17, 1930.

J. W. Bartlett Leaves *the* Houston Gulf Gas Co.

J. W. BARTLETT has resigned his position as superintendent of the Houston Gulf Gas Company and of the Dixie Gulf Gas Company, subsidiary companies of the United Gas Company of Houston, to become associated with Walter Reid, consulting natural gas engineer, of Dallas. The new firm will be known as Reid and Bartlett Consulting Engineers.

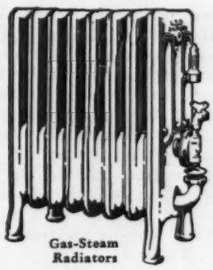
J. W. Bartlett

Mr. Bartlett has been associated with the Houston properties for the past three and a half years, going to them in 1926 as superintendent of measurement of the Houston Gulf Gas Company. In 1927 he was made superintendent of the company and in 1929 was appointed superintendent also, of the Dixie Gulf Gas Company.

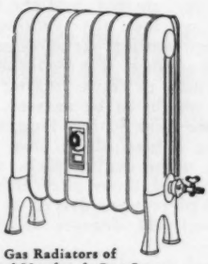
Prior to joining the Houston companies, Mr. Bartlett was for two years associated with the measurement department of the Lone Star Gas Company of Dallas. During the last year with the Lone Star he was in charge of the chart department. He came to this company from the Texhoma Oil Company of Wichita Falls, Texas, with which he was associated in 1923 and 1924.

Mr. Bartlett is a graduate of the Agricultural and Mechanical College of Texas in Chemical Engineering, with the class of 1923. Prior to his graduation he was for three years connected with the Dallas Trust and Savings Bank.

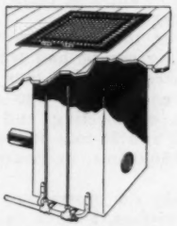
Headquarters are maintained by the engineering firm in the Athletic Club Building, Dallas.



Gas-Steam Radiators

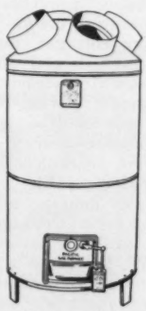


Gas Radiators of Pressed Metal and Cast Iron



Pipeless Floor Furnaces

Dual Pipeless Furnaces



The New Perfected Pacific Gas Unit Furnaces

Recessed Wall Heaters

Every Type

of Gas-Heating Appliances from One Responsible Firm

NO MATTER what the heating problem, regardless of the kind of heating required, there is a Pacific Gas appliance to meet the need. For a single room or a mansion, a small office or a big auditorium, you, as a Pacific Gas agent, can supply exactly the right heating system for the job.

This **completeness** of the Pacific Gas line has obvious advantages. You don't have to buy from a dozen firms. You get a better deal and better prices by purchasing from a single house. You understand the line better. There is more complete responsibility. Your guarantee means more because you thoroughly understand the guarantee of the makers and are working more closely with them.

There are other advantages too. Note the brief descriptions below of Pacific Gas appliances, then write for full details of our attractive dealer proposition.

Pacific 5-Column Gas-Steam Radiators

Beautiful, economical, enduring, these new-style 5-column Pacific Gas-Steam radiators provide comfortable steam heat quickly when wanted, in any room. They have instant appeal to your customers. Used in finest homes.

Pacific Gas Radiators

This type uses no water. They are simple, compact, durable, quick-acting, convenient, and economical. Of pressed metal for homes and heavy cast iron for service in public buildings, offices, etc.

Pacific Wall Heaters

This popular heater is easily installed, efficient, economical, and operates on varying gas pressure. Two styles enable you to meet both price and quality competition.

Pacific Floor Furnaces

Scientific design, with sealed combustion chamber and heavy cast iron heating unit, assure perfect uninterrupted heating service for many years.

Pacific Gas-Unit Furnaces

One or more of these latest type round gas furnaces provide warm air outlets to every room. Electric or manual control, or connected with automatic heat regulator to turn heat on at any hour desired. Long-lasting. Trouble-proof. Satisfactory to sell and to use.

Pacific Fireplace Radiant Heaters

There is a complete line of Pacific radiant heaters in many styles and finishes. The Pacific New-Feature burner provides complete combustion with any type gas, without need of adjustment by owner.

Pacific Automatic Water Heaters

Pacific Gas water heaters are of both the instantaneous and automatic storage types. The latter have center heating flues and outside shell of boiler is also used as a heating surface. Very efficient, economical, well-insulated, and with positive thermostat control. Many types and sizes.

Pacific Gas Radiator

Gas Heating **Company** *Headquarters*

Roseberry and Walter Sts., Huntington Park, Calif.

Write us about the attractive Pacific Gas Agency proposition for your territory

1929 Marks Extended Development *in* California Natural Gas Industry

By CLAUDE C. BROWN
Gas Administrator
California Railroad Commission

THE year 1929 stands out as one of great accomplishment and expansion in the natural gas industry of California. During the year the use of this commodity for fuel purposes was extended to more than 96,000 additional consumers, who had heretofore been furnished with manufactured oil gas or who had had no gas service whatsoever.

C. C. Brown

During the year 1929 there was produced from 36 fields in California a total of 558 billions of cubic feet of natural gas of which 309,157,000,000 cubic feet were utilized and 248,477,000,000 cubic feet were blown into the air in the oil fields. The greater portion of this gas was produced in conjunction with crude oil, and when produced contained a large quantity of natural gasoline. Practically all of this gas was passed through gasoline extraction plants of which there are 143 operating in California, thereby producing a total of 832,325,000 gallons of natural gasoline.

On but one day during 1929, namely, February 9, was it necessary to shut off the natural gas supply to industrial users in order to insure an adequate supply to domestic users, due to excessively cold weather.

Notable extensions were made in the natural gas transmission facilities of the public utility corporations of the state, the cost of which runs into many millions of dollars. Among these extensions are the Buttonwillow-Kettleman-San Francisco line of the Pacific Gas and Electric Company, the Kettleman-Fresno line of the Southern California Gas Company and other smaller lines throughout the state.

The completion of these lines extends the service of natural gas to a substantial portion of the area lying between Bakersfield and the Bay cities.

The construction of additional lines contemplated in the near future will further increase the extent of this service and result in an almost universal use of this commodity for domestic and industrial fuel purposes in California.

At the present time there is a total of 1,400,000 gas consumers in the state, 65 per cent of whom are using natural gas. With the completion of the contemplated additional lines this percentage will be increased to over 95 per cent.

The following is a summary of the production, utilization and wastage of this natural resource in California during the year.

(1) *Production*

Total net production, 557,634,000,000 cu. ft.

(2) *Utilization*

Underground storage, 14,073,000,000 cu. ft.
Gasoline plant fuel and shrinkage 79,398,000,000 cu. ft.
Field fuel 77,764,000,000 cu. ft.
Refinery fuel 18,195,000,000 cu. ft.
Public utility use 119,727,000,000 cu. ft.
Total 309,157,000,000 cu. ft.

(3) *Wastage*

Blown to the air 248,477,000,000 cu. ft.

During the year 1929, the proven area of potential production of natural gas has been greatly increased, as to the production area of present fields, the development of deeper producing sands in present fields and through the discovery and development of additional and new fields. Notable among the latter is the Kettleman Hills Field in Kings county.

In order that this natural resource may be more adequately conserved, the last Legislature passed an act covering this subject, the effect of which together with the activity of the Federal Government relative to the conservation of natural gas in its present lands, has resulted in a substantial decrease in the wastage of this resource.

In addition to this, the oil industry itself has materially aided the cause of conservation by re-injecting into under-ground structures a portion of the surplus gas production and by curtailing the production in high pressure wells.

Largest Compressor Station Begins Service *in* Louisiana

(Continued from Page 31)

gine parts, one 20-inch shaper, one 24-inch drill press and one 2-horse power tool grinder. All of these are modern motor driven machine tools.

Water for cooling the engine jackets and discharge gas is obtained from three deep water wells located on the property. Each of these wells is equipped with an 84-foot steel tower on which is mounted a combination flow head and gas separator. Natural gas is used to flow the wells, after which it is separated and returned to a 20-foot fuel header located in the main engine room basement, to supply fuel for the engines.

Water from the wells is forced into the flow heads at the top of the tower, from whence it flows by gravity into the 200,000-gallon storage tank. From this tank it again flows by gravity to the gas cooling tubes to cool the discharge gas, after which it flows again by gravity to a cold water pit located outside the auxiliary building.

From this pit the water is delivered to the engine and compressor jackets by the 2500-G. P. M. pumps, after which it returns with the heat it has absorbed from the engine jackets, through a 24-inch tile drain to a hot water pit located alongside the cold water pit. A portion of this hot water is then taken up by the 50-G. P. M. pumps and circulated through radiator coils to heat the buildings. The surplus water flows into the river.

Because of the peculiar nature of the soil conditions encountered, and the necessity for providing against the rocking action of heavy reciprocating parts on such a large number of engines, it was deemed advisable to drive piling to resist rocking and sustain the great weight to be carried. Therefore, 462 concrete piles 30 feet long, each capable of carrying a load of 30 tons, were driven under the main engine piers and building walls. Four of these piles on each end of the engine piers were driven at an angle of approximately 11 degrees to resist rocking action.

On top of this piling was poured a 3-foot solid reinforced concrete mat to which the engine piers and building piers were tied by steel reinforcing rods.

Some idea of the enormous weight resting on the piling can be had when it is estimated that there are 9,442 tons of concrete; 1,430 tons of engines, 200 tons of structural steel, 35 tons of sheeting and roofing, 40 tons of cranes, and 50 tons of piping, making a total of 11,300 tons, or nearly 24½ tons to each pile.

It is stated by the contractors that at each stroke of the pistons, a force equivalent to a 90-ton blow is imparted to the foundations. This means that each twin engine operating at normal speed of 125 R.P.M. will impart 500 such blows per minute to the foundation, or a total of 5,000 per minute for the 10 engines.

The exterior of the building is painted eggshell white with grey trim. The engine color is machinery green enamel, and all piping is aluminum.

The main building is brilliantly lighted by 33, 500-watt lamps with white porcelain reflectors. An emergency lighting system is also provided by current supplied from storage batteries, for use in case of interruption to the main lighting system. Flood lights located on the water tower provide yard lighting for the piping system and gas cooler.

Excellent housing provisions have been made for the operating crew. Four six-room and 12 five-room cottages, together with a 10-room hotel, garages and all modern conveniences have been constructed. The house spacing, with ample lawns, concrete walks, fire plugs, and graveled boulevard, presents a very attractive appearance.

All construction work has been done under the supervision of M. J. C. Ferguson, vice-president and general manager of the Republic Construction Company, with temporary offices in the Bernhart Building, Monroe, La. W. R. Casey was construction engineer on the station. Installation of electrical equipment was made under the supervision of John Christie.

Actual construction work was started on July 1, 1929, and with a well trained construction organization and favored by splendid weather, record-breaking progress has been made.

The first compressor unit was put in operation without load on October 15, just 107 days after construction work started, and on October 31 actual operation of the plant began, with two engines in operation delivering gas into the 20-inch Shreveport line, just 123 days after ground was broken. On

EVERY MONTH MILLIONS OF MAGAZINE READERS LEARN ABOUT IDEAL GAS BOILERS

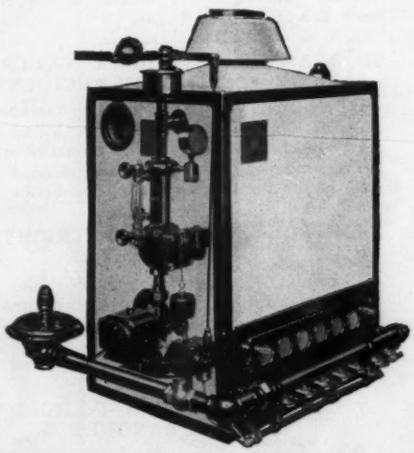
WHY

AMERICAN RADIATOR COMPANY

manufactures

IDEAL GAS BOILERS

AUTOMATIC heating that is really automatic, has come to stay. Realizing this, the largest manufacturer of heating equipment in the world has developed Gas Boilers that are the last word in efficiency. In the general heating field, products of this company have long been the standard by which others are judged. And now Ideal Gas Boilers occupy that same enviable position.



manufactured by

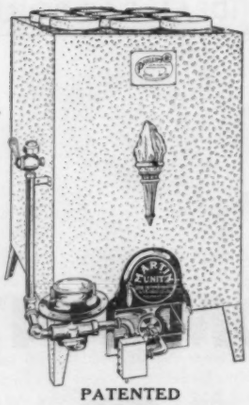
AMERICAN RADIATOR COMPANY

sold by

AMERICAN GAS PRODUCTS CORPORATION

Chrysler Building, New York

EVERY MONTH MILLIONS OF MAGAZINE READERS LEARN ABOUT IDEAL GAS BOILERS



PATENTED

Martin Unit Gas Furnaces

ARE THE RESULT OF 38 YEARS HEATING EXPERIENCE
MADE IN FOUR SIZES
Electric, Thermostat or Manual Control
Approved by A. G. A. Laboratory and by the City of Los Angeles
Write for your copy of "Modern Heating Methods"

PHILLIPS HEATING, VENTILATING & MFG. CO.
1710 W. Washington St.
Los Angeles, California

Live Agents Wanted

TESTING LABORATORY A.G.A. APPROVED

that date six of the 10 engines were ready to be put into service.

On December 31 the Arkansas Natural Gas Company put another newly completed compressor plant into operation—the Barton Compressor Station, located one and a half miles north of El Dorado, Arkansas.

With the completion of Munce and Barton Stations, there is now a total of 27,075 compressor horse power on the lines of the corporation system, 12,500 horse power having been added to the system since the acquisition of the old Arkansas Natural Gas, Southwestern Gas, Reserve Natural, and other properties by the Henry L. Doherty interests. In addition to the compressor horse power, there is a total of 1810 horse power installed and used for lighting and power purposes at the 11 compressor stations on the company's lines. There are also water pumps with a total capacity of 19,200 gallons per minute installed at these 11 plants.

Seventy men are engaged in the operation and maintenance of these plants, which are the heart of the Arkansas Natural Gas pipe line system bringing gas to the 86 communities served by this company.

EDUCATIONAL PROGRAM FOR LONE STAR SPONSORED BY B.T. UTOPIANS

A gas measurement school is being sponsored by the B. T. Utopian Club, employee organization of the Lone Star Gas Company, of Dallas, as part of an educational program conducted under the auspices of the club. E. E. Stovall, of the measurement department of the company, is instructor of the school which meets twice weekly. Eighty members of the club have registered for the measurement course. W. G. Wiegel is president of the B. T. Utopians.

WALTER REID

ANNOUNCES THE ASSOCIATION WITH HIM OF

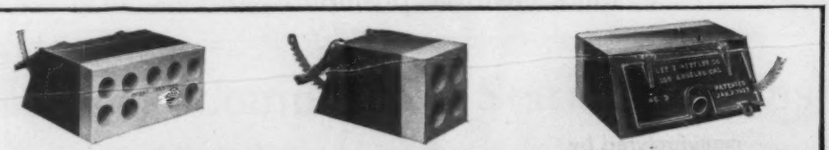
J. W. BARTLETT

UNDER THE FIRM NAME

REID AND BARTLETT

CONSULTING ENGINEERS
NATURAL GAS AND PETROLEUM
1219 ATHLETIC CLUB BUILDING

DALLAS, TEXAS



Mettler Entrained Combustion Gas Burners

FOR ALL Purposes, Kinds of gas, Pressures

406 S. Main St. **LEE B. METTLER. CO.** Los Angeles Cal.

Pioneering Refrigeration

(Continued from Page 52)

ruary Mr. Munters made his first public appearance in America at a meeting of the Southern Counties Gas Company commercial representatives, February 13 in Los Angeles. For their benefit he told the running story of the gas refrigerator which is recounted in part here.

Mr. Munters, as head of the research laboratory of Electrolux, has had the satisfaction of carrying his invention through the whole course of its development, seeing it widely adopted in use throughout the world.

That a practical, gas-fired refrigerator, without moving parts, should have resulted from the inventive genius and energy of two young Swedish students, handicapped by many circumstances, is one of the marvels of modern times. Youth and perseverence accomplished what scientists and engineers had sought in vain over a period of several decades. It is a tribute to the practical approach, for Mr. Munters emphasized to the writer repeatedly that their methods were always the reverse of the text-book method. While they undoubtedly retraced steps and covered needless ground to attain their goal, in so doing they avoided pitfalls of earlier developments. The trial and error method, supplemented by a knowledge of basic physical and chemical laws and a maximum of hard work, brought them through. Their work has given the gas industry an appliance which performs a modern task in the modern home, injecting another element of romance into the industry and making the public increasingly gas conscious.

SO. CAL. GAS CO. ASKS FOR DELANO FRANCHISE

Southern California Gas Company, with headquarters in Los Angeles, California, has applied to the California Railroad Commission for a franchise for the service of natural gas in Delano, Calif. The company has also applied for permission to exercise franchise rights in Ceres, Stanislaus County, and Shafter, Wasco, and McFarland, in northern Kern County.

SOUTHERN UNION GAS COMPANY GETS SANTA FE FRANCHISE

The city council of Santa Fe, New Mexico, has granted a 25-year natural gas franchise to the Southern Union Gas Company, and gas is to be delivered to the city within 10 months. Headquarters offices of the company are at Dallas, Texas.

ED BEASLEY, OKLAHOMA NATURAL EMPLOYEE, KILLED IN ACCIDENT

Ed Beasley, employee of the Oklahoma Natural Gas Corporation, was killed recently by an explosion which occurred when he was turning on the gas flow near a gas well in the South Oklahoma City field.

ELECTROLUX NAMES DISTRIBUTOR AT PAMPA, TEXAS

Electrolux Refrigerator Sales, Inc., of Evansville, Indiana, announces the appointment of the Thompson Hardware Company as distributor for the company's products in Pampa, Texas.

CALIF. O. & G. ASS'N. TO HOLD ANNUAL BANQUET

The Annual Banquet of the California Oil and Gas Association will be held in the Sala D'Oro of the Biltmore Hotel in Los Angeles, California, on March 6, 1930.

Selling Radiant Heat

A Practical Page for Appliance Salesmen

No. 3

Wheel up the Heavy Artillery

No. 55 is a good "in between" priced Radiantfire. A Louis XVI period design; it is finished in silver, gray and brass.

The salesman who is anxious to turn his fountain pen over for the temporary use of a prospect is sometimes confronted with the necessity of keeping the sales arguments rolling at all cost. There is nothing so uncertain as a customer almost sold. When he starts to waver, then is the time to wheel up the heavy artillery.

Here is some ammunition: Radiant heat is healthful; like the sun, it contains infra-red and ultra-violet health giving rays.

Radiant heat penetrates: Old folks particularly notice that heat from the Radiantfire gets to their bones better than any other kind of artificial warmth.

Radiant heat is intense and like light, goes in the direction sent. Drafts do not affect or waste it.

Other forms of fireplace heat throw 90% of the heat up the chimney. The Humphrey Radiantfire sends 90% of its heat into the room.

Radiant heat warms the floor and the body first. Human beings don't live on the ceiling; why heat it first?

The Humphrey Radiantfire burns gas, but is odorless and does not vitiate the air. It actually helps to ventilate a room.

Radiantfire heat is: Clean; inexpensive; healthful; convenient, and scientifically correct.

Made in many designs, at many prices. There is a Humphrey Radiantfire for every taste and every pocketbook.

Over five million people are using Humphrey Radiantfires. Five million Americans can't be wrong.

The HUMPHREY

Radiantfire

TRADE MARK REG. U.S. PAT. OFF.

Pacific Coast Manager
C. B. Babcock
135 Bluxome St.,
San Francisco

Manufactured by
General Gas Light Co.,
Kalamazoo,
Michigan

Look what this *New* gas range does

It can cook a whole meal around one burner. Note space on big cooking top.

Its smooth, flat top lets pots slide easily. Smallest pots will not tip or spill. Very easy to keep clean.

Heat from one burner keeps the whole meal steaming hot between courses, or while waiting to be served.

NO other range offers features more attractive to the modern housewife's ideas of cooking. No other gas range has 4 definite heat zones . . . speed-spots, busy-boiling, simmering and warming zones . . . no other a broad solid top with every square inch actual cooking surface. New approved comfortable working height.

All these are added to the standard improvements; evenly heated oven with heat regulation and time chart, automatic self-lighting burners, scores of other special Smoothtop improvements! Insulated oven optional.

Smoothtop

GAS RANGE

CAPTURES THE FLAVOR . . . FREES THE COOK

. . . and look what it can do *for* YOU!

No Competition

. . . The 1930 Smoothtop Gas Range is the only gas range of its kind on the market . . . a new, fast-growing market in itself.

Longer Profit

. . . Smoothtop is the outstanding gas range specialty—and carries a specialty profit. You make more money on every Smoothtop sold.

National Advertising

. . . A great national magazine advertising campaign will carry Smoothtop's slogan "Captures the flavor . . . frees the cook" to millions of women. This slogan has a real sales-making meaning to housewives right in your town.

Complete Sales Cooperation

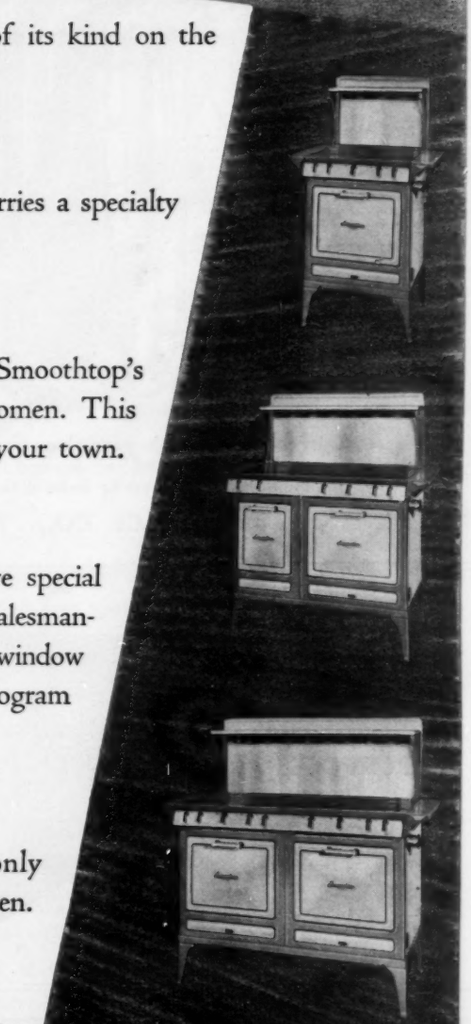
. . . When you take on Smoothtop, your salesmen will receive special free training in the most up-to-date retail and house-to-house salesmanship. You get local newspaper advertising helps, floor displays, window displays, and cooking schools. This complete sales training program will rapidly turn Smoothtop profits into your cash drawer.

Exclusive Territory

. . . Once you're carrying Smoothtop, you become the only Smoothtop dealer in your territory. Act while territory is open.

Write for complete merchandising set-up

. . . to Standard Gas Equipment Corporation . . . 18 East 41st Street, New York City. Makers of . . . Smoothtop . . . Oriole . . . Vulcan . . . the standard domestic and heavy-duty gas ranges wherever gas is used. Pacific Coast Distributor: Northwest Gas & Electric Equip. Co., Portland, San Francisco, Los Angeles



A size for every kitchen and every cooking need

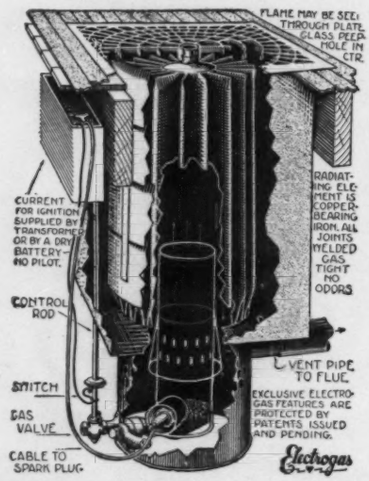
Smoothtop

GAS RANGE

CAPTURES THE FLAVOR . . . FREES THE COOK

Electrogas

FLOOR FURNACES


FLAME MAY BE SEEN THROUGH PLATE GLASS PEEP HOLE IN CTR.
RADIATING ELEMENT IS COPPER-BEARING IRON. ALL JOINTS WELDED GAS TIGHT NO ODORS
CURRENT FOR IGNITION SUPPLIED BY TRANSFORMER OR BY A DRY BATTERY—NO PILOT.
CONTROL ROD
VENT PIPE TO FLUE
SWITCH
GAS VALVE
CABLE TO SPARK PLUG
EXCLUSIVE ELECTRO-GAS FEATURES ARE PROTECTED BY PATENTS ISSUED AND PENDING.
Electrogas

The original electrically ignited furnace.

—

Hollow, streamlined fins offer unusual efficiency.

—

Fool-proof

available in four sizes:
20,000 BTU
25,000 „
30,000 „
40,000 „
also in Cabinet type.

Electrogas, now in its tenth year, has won a reputation for efficiency, freedom from servicing, and all-around satisfaction which is second to none. It will pay you to handle this remarkable appliance.

ELECTROGAS FURNACE CO., Rialto Bldg., San Francisco

GAS BURNERS

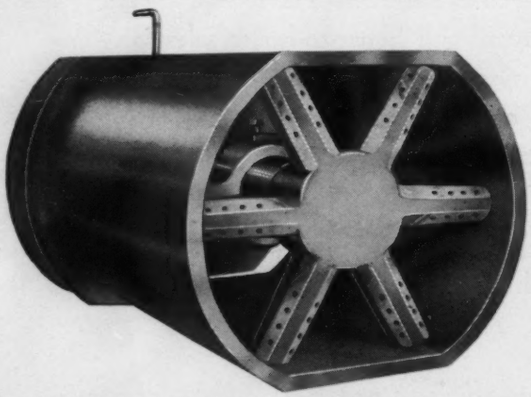
For

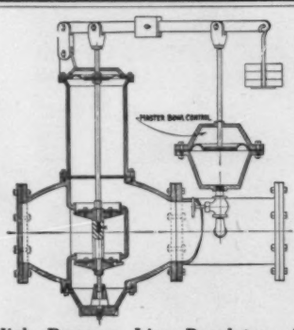
ALL INDUSTRIAL PURPOSES

JOHN ZINK CO.
Oklahoma Natural Gas Bldg.
Phone 4-9838
TULSA, OKLAHOMA

★

Flame Burners
Short Flame Burners
Flameless Burners





High Pressure Line Regulators for reducing pressure from pounds to pounds.

GROBLE REGULATORS & GOVERNORS

Groble Features—

Large Hand Holes
Balanced Valves
Two Piece Valve Stem
Master Bowl Control

Made in sizes from 2 inch to 10 inch.

GROBLE GAS REGULATOR COMPANY, Anderson, Ind.

MEMPHIS NATURAL SUPPLIES GAS TO ARKANSAS TOWNS

Natural gas is being supplied to McGhee, Dermot, Lake Village, Euodora and Wilmot Arkansas, from the 219-mile, 18-inch natural gas line of the Memphis Natural Gas Company originating in Louisiana. The Arkansas Power & Light Company serves gas at retail in these towns. A news report in *Western Gas* for January stated through error that gas was being supplied these towns from the Louisiana-St. Louis line.

The Memphis Natural Gas Company serves the city of Memphis from this line, and a number of towns in north Louisiana, Southeast Arkansas and in the Delta region of the Mississippi, along the route of the line.

The Louisiana Power & Light Company distributes gas in Gallion and Bonita in Louisiana; and the Mississippi Power & Light Company serves gas in Mississippi to Greenville, Cleveland, Merigold, Shelby, Clarksdale, Lyons, Lula and Tunica. The Arkansas Power & Light Company is distributor of gas from the Memphis Natural line in Arkansas.

CITIES SERVICE GAS COMPANY WILL EXTEND DILWORTH-PERRY LINE

The Cities Service Gas Company, a subsidiary of the Empire Companies at Bartlesville, has announced the construction of a 20-inch natural gas line from a point in Logan county, Oklahoma, 15 miles south of Perry, to the South Oklahoma City oil and gas field.

The line, which will be an extension of the company's 20-inch line running through the Dilworth compressor station to Arkansas City, Kansas, will be approximately 50 miles in length, and will connect the Cities Service system to the Oklahoma field as well as provide an outlet for the gas reserve of the Indian Territory Illuminating Oil Company, one of the Empire companies, having extensive holdings in the Oklahoma City field. The line will have a capacity of 100,000,000 cubic feet daily.

FLO ZIEGFELD TO JUDGE IN DOHERTY BEAUTY CONTEST

The Doherty News Beauty Contest being conducted over the Doherty properties to select the most beautiful girls affiliated with the organization, has as judge, Florenz Ziegfeld, noted theatrical producer and "glorifier of the American girl." This is the second beauty contest which the Doherty News, published at the New York headquarters of the Doherty interests, has conducted. Photographs of those entered in the contest will be judged by Mr. Ziegfeld.

L.A.G. AND E. AUDITORIUM TO HAVE AMPLIFYING DEVICE

Amplifying equipment for musical reproduction and public speaking is now being installed in the auditorium of the Los Angeles Gas and Electric Corporation. This auditorium is used regularly by the corporation and its employees for meetings, entertainments and dramatic productions. The new installation was scheduled to be in operation by March 1.

TEXAS CITIES TO SPEND $100,000 FOR WACO IMPROVEMENTS

C. V. Allin, local manager of the Texas Cities Gas Company at Waco, Texas, has announced a construction and improvement program for the company in Waco, amounting to approximately $100,000. The expenditure will largely consist of extensions to distribution system and the relaying of mains.

For Complete Safety *for* STORAGE HEATERS *.....this Proved* SAFETY PILOT!

The No. 730 Safety Pilot — an exclusive, *patented* Time-O-Stat product.

THE outstanding dependability and safety of the Time-O-Stat No. 730 Storage Water Heater Safety Pilots has won recognition throughout the gas industry. This pilot controls the flow of gas to the main burner. In the event of flame failure, the pilot shuts off the main gas supply.

We also manufacture a complete line of safety pilots for all gas-fired heating equipment.

These *completely safe* Safety Pilots are important items in Time-O-Stat's extensive line of automatic controls — all have been perfected in Time-O-Stat's research laboratories. Together they form the most complete line of automatic controls in the gas industry.

Our engineering department is always at your service to work out any individual control problem.

For full information on these products—write or wire today!

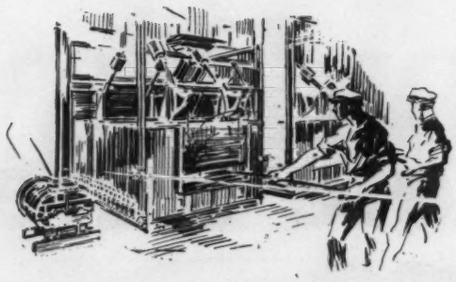
TIME-O-STAT AUTOMATIC CONTROLS

TIME-O-STAT CONTROLS COMPANY

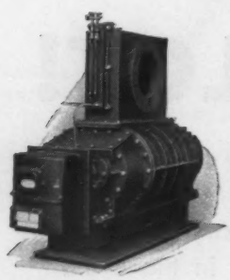
ELKHART, INDIANA

Branch Offices and Exclusive Distributors in All Principal Cities of the United States.
Canadian Distributors: Toronto and Montreal.

Manufacturers of AUTOMATIC CONTROLS *for Oil Burners — Gas Burners — Coal Burners — Electric Refrigerators — Furnace Fans — Mechanical Stokers — Industrial Ovens — Ice Machines — Unit Heaters . . . . . also of Sign Flashers — Mercury Switches — Electric Heaters — Corrugated Metal Bellows.*



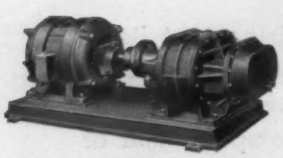
Dependable Aids for your Industrial Installations



Connersville Meter with Demand Recorder

Connersville Meters

A meter that is all metal with an unvarying non-adjustable displacement machined into it—the accuracy maintained throughout extreme variations in flow—large capacity in a single meter—easy to install—easy to read—free from the need of frequent adjustment or repairs. Description in Bulletin 4D and 305.



Victor Air Blower or Gas Booster

Victor Positive Rotary Blowers

A positive supply of air from the Victor positive Pressure Blower is an excellent aid to satisfactory gas burner service. There is a Victor Blower for any volume of air from 5 C.F.M. and larger. Bulletin 121 contains the ratings, R.P.M., power requirements, etc., of these Victor machines.

Victor Gas Boosters

When your industrial consumer requires gas pressures at the burners, higher than are carried in the mains, a Victor Gas Booster will economically increase the pressure for this user, giving him a positive supply of gas that may be easily controlled at an even pressure. Bulletin 233 describes the special construction features of Victor Gas Booster.

A post card with your name and address will bring any of these bulletins to you.

The Connersville Blower Company

Michigan Ave. at 16th St.

Connersville, Indiana.

CONNERSVILLE

Blowers-Gas Pumps-Meters-Cycloidal Pumps

UTILITY VETERANS HOLD ANNUAL BANQUET

The 18th annual banquet of the Old Guard of Los Angeles Gas and Electric Corporation was held Wednesday evening, February 5, at the Biltmore Hotel, Los Angeles. The Old Guard is composed of employees of the utility company who have been with the organization for 10 years or longer. The present membership totals 412, counting the 61 new members added at this time.

On this occasion one man, W. B. Cline, former president of the corporation and now chairman of the Board of Directors, was advanced to the 40-year class, and Addison B. Day, president and general manager, advanced to the 35-year group. There are now four 35-year men and five 30-year men. In addition, nine others joined the ranks of the 25-year men, 26 advanced to the 20-year group and 12 others became 15-year men. More than a third of the Old Guard membership have been with the utility company for more than 20 years, and the entire membership represents approximately 15 per cent of the regular employee body of the company.

Addison B. Day, president and general manager, was toastmaster of the evening. Tribute was paid to the memory of former president, Wm. Baurhyte, vice-president Champ S. Vance, E. B. Brown, P. M. Parrell, F. E. Harrington and J. T. Moore, all of whom passed away during the year, and to nine other members who retired from active service during that period.

EMPIRE COMPANY USES GAS FROM UNDERGROUND STORAGE

The Empire Company at Bartlesville, Oklahoma, recently called into service natural gas which the company had successfully stored in the underground sands in a group of gas wells near Eldorado, Kansas, located near the 20-inch natural gas line of the Cities Service Gas Company, extending from the Amarillo, Texas, fields to Kansas City.

The gas was stored in the wells over a period of months during the early fall season, and called into use at the height of the cold weather.

Gas from the wells was served at Eldorado for periods of two, six and eight days at a time with no interruption of service or lessening of pressure.

KANSAS CITY GAS COMPANY OPENS COUNTRY CLUB PLAZA OFFICE

The Kansas City Gas Company opened a new branch office in the Country Club Plaza, one of Kansas City's most popular shopping centers, on February 8. The new office consists of two floors, the first floor which will be utilized for offices and appliance display space; and a basement which will be used for cooking schools, sales meetings, etc.

A model kitchen has been installed in the basement, and twice each week cooking schools will be conducted by the company for the women of the district.

MARYSVILLE, KAN., TO HAVE GAS BY MIDDLE OF MARCH

Kansas Pipeline and Gas Company expects to supply gas at Marysville, Kansas, during March. Gas will be supplied the city through a branch line tapping the main line of the company to Grand Island, Nebraska, originating in the gas fields at McPherson and Medicine Lodge. Clifton, Clyde and Clay Center are among the towns already using gas from the line.

Warm guests--
when there is heat at a finger's touch
Cheap natural gas brings the luxury of automatic, care-free heating to every home. A thermostat or a push-button regulates the temperature. No trips to the basement on cold mornings. No bother about starting a fire when friends come—a finger's touch gives you instant heat. And any healthful temperature is maintained throughout your home.
With clean natural gas, the curtains, wall-paper and furniture retain their fresh cleanliness. There is no smoke or soot about your property.
of hotter, cleaner and cheaper fuel
Even though you have no basement, there are fine types of gas-fired equipment for your home.
Natural gas contains twice as much heat as the former manufactured gas. Natural gas is a much cheaper fuel. It is the easiest fuel to control and is absolutely safe when burned in modern appliances, correctly installed.
For full details about heating equipment that burns the cheap natural gas, see a heating contractor or phone or call at our office.
Natural Gas
SERVED BY THE
PACIFIC GAS AND ELECTRIC COMPANY
P · G · and E ·

Reproduction of a 4 column 15" newspaper advertisement now running in territory where Natural Gas is being served and also where it will be served this Spring.

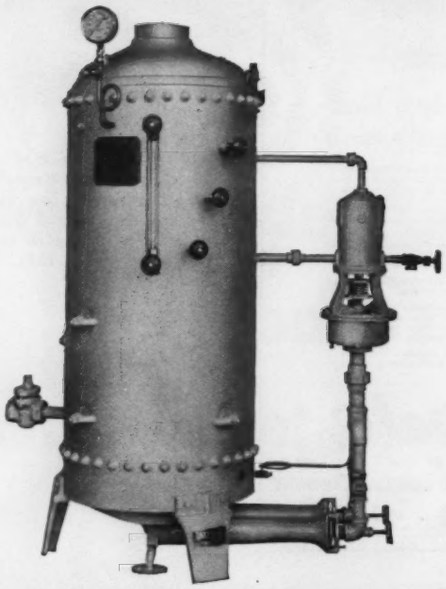
Advertising written to help *you*

The above advertisement is written to influence the public's opinion in favor of Natural Gas as a fuel for house heating. You, as a seller of gas heating equipment, benefit because it puts the buyer in a favorable state of mind and your selling job is easier.

PACIFIC GAS AND ELECTRIC COMPANY
P·G·and E·
Owned · Operated · Managed
by Californians

Automatic Gas Fired Boilers

LATTNER



All Sizes from ½ to 30 H. P.

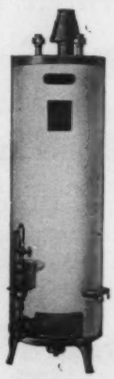
P. M. LATTNER MANUFACTURING CO.

Cedar Rapids, Iowa

A Heater that Will Deliver a Gallon of Hot Water for Every *1 Foot of Natural Gas.*

THE heater is finished in lustrous enamel.

300-lb. test copper-bearing Steel tank.



New Efficient Insulating Material.

Safety Pilot.

Combination Safety and drain valve.

2 sizes: 25 gal.—40 gal.

Pittsburg Monarch Automatic Storage Water Heater

Made in 2 Sizes
25 Gallons—40 Gallons

Pittsburg Water Heater Company

Offices at:

478 Sutter St. San Francisco

2010 Jackson St. Dallas

242 So. Western Ave. Los Angeles

GAS IMPROVEMENTS TO TOTAL $570,995 IN SAN ANTONIO

REPORTS presented by President Tuttle and Vice-President Kifer of the San Antonio Public Service Company to the stockholders at their annual meeting held during February, indicate a favorable financial and physical condition. The following are included among the outstanding activities of 1929:

Increased supply of natural gas due to installation of new line into city. It was necessary to shut down the Southern Gas line for repairs during the extremely cold weather last fall, and the new line made it possible to maintain service during a critical period.

Substitution of natural gas for pulverized lignite at Comal Plant.

Construction of a high pressure gas main from the new Magnolia line to the Somerset station of the Southern Gas Company.

These items represent the outstanding achievements of the Company in its gas department during 1929. Mr. Kifer's report showed a steady and healthy gain in the number of gas meters installed, and a satisfactory increase in cubic feet in sales of gas. The company's payroll in 1929 amounted to $2,843,378.59.

In concluding his report to the directors, President Tuttle stated that the gas construction budget recommended by the officers of the company for the year 1930 amounts to $570,995.

LONE STAR GAS CO. HOLDS INTER-COMPANY MEETINGS

The Public Relations Department of the Lone Star Gas Company of Dallas is sponsoring a series of inter-company meetings over its system for the purpose of discussing in each district the problems local to that district. Each meeting is attended by district employees and by company officials.

The first meeting of the series was held at Greenville, Texas, on January 10. Similar meetings were held in February at Temple and Sweetwater.

One of the features of each meting is a banquet followed by talks given by company officials and a general discussion period.

SOUTHERN COUNTIES GAS CO. BUILDS CLAREMONT OFFICE

Southern Counties Gas Company, which maintains headquarters offices in Los Angeles, California, will start construction on a new building in Claremont, California, in the company's Pomona District, during March. The new structure will be typically Californian-Spanish, similar to the company's office at Laguna Beach. C. G. Spencer is manager of the Pomona District.

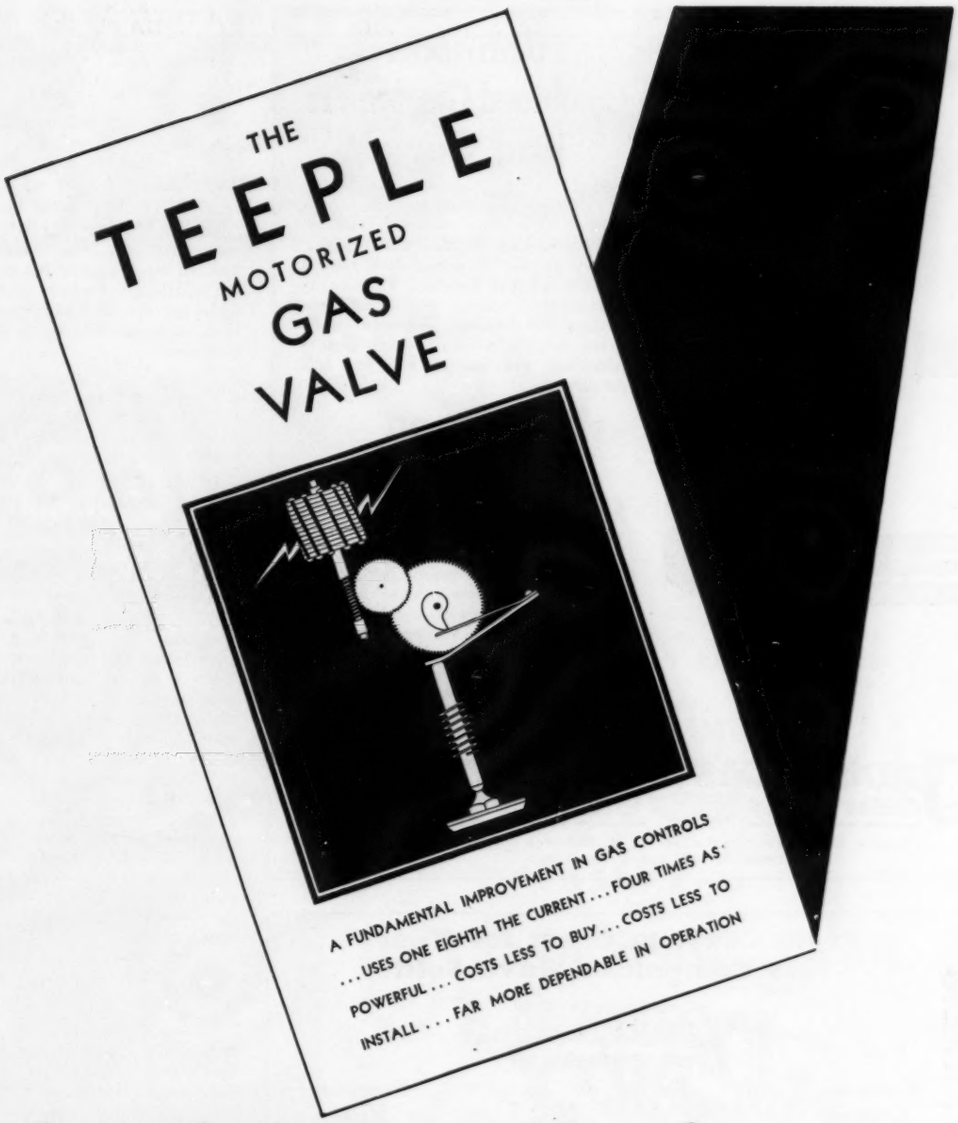
THIRD CUSTOMER OWNERSHIP CAMPAIGN MAR. 17-27

The third Customer Ownership Campaign of the Arkansas Natural Gas Corporation will be held from March 17 to 27. This annual campaign, through the employees of the company, offers Cities Service Company securities to the customers of the company. Arkansas Natural is a Doherty interest.

THE FOXBORO COMPANY MOVES LOS ANGELES OFFICES

The Foxboro Company of Foxboro, Massachusetts, announces the removal of the Los Angeles office to 2307 East Eighth Street.

This office has been reorganized with Dudley M. Hill in charge, assisted by a new staff of trained and experienced engineers.



This folder tells the story of The TEEPLE VALVE

One of the most important recent developments in automatic gas heating has been the announcement of the Teeple Motorized Gas Valve. Because of its many improvements the Teeple Valve is so far ahead of the ordinary gas valve that it sets up entirely new standards of dependability and performance . . . How it is more efficient, more powerful, more economical, easier and cheaper to install, and why it delivers an operating result far superior to other valves is fully explained in an interesting folder just published, a copy of which will gladly be sent to you. Simply fill out and mail the coupon.

TEEPLE

L. R. Teeple Company
540 East Ninth Street, Portland, Oregon

— — — — — — — — — CLIP AND MAIL — — — — — — — — —

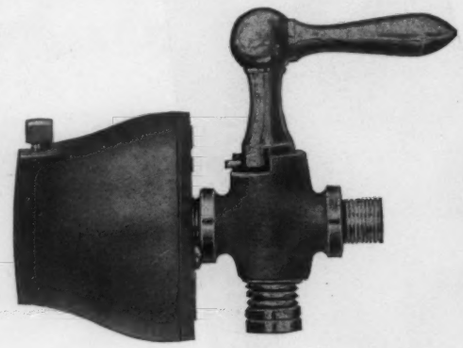
L. R. TEEPLE CO.
540 E. 9th St., Portland, Oregon
Please send me a folder on the **Teeple Motorized Gas Valve.**

Name

Company

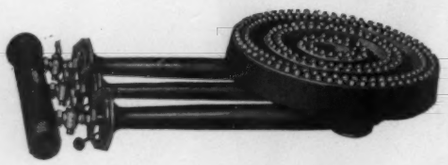
Street Address

City State W3



Johnson Combined Gas Mixers and Cocks

The Johnson Atmospheric Mixer is reliable, efficient, and economical. The Gas Cock used in connection with the mixer is a heavy A. G. A. type with round handle, nickel finish. This combination of mixer and cock embodies exclusive Johnson features which produce highly satisfactory results. Write for full details.



Johnson Ring Burners

Johnson 60BCE Ring Burners are designed and built for efficiency, durability, and economy. They embody many exclusive Johnson features whose superiority is recognized by hundreds of users. Whatever may be your needs in this line, write to us. If our standard products will not meet your specific needs, we will design and build special burners for your particular use.

JOHNSON GAS APPLIANCE CO.
Cedar Rapids IOWA

Pacific Coast Representative: C. B. Babcock Co.,
135 Bluxome Street, San Francisco

From Coast to Coast for Years Gas Companies Have Sold

DOUBLE DUTY
REG. U.S. PAT. OFF.

Removes Grease *Prevents Rust*

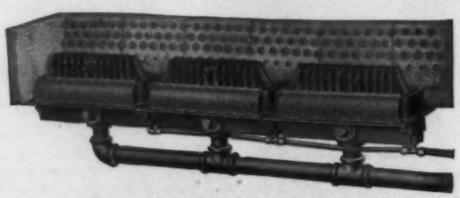
GAS RANGE & STOVE CLEANSER

WALMAR LABORATORY Oshkosh, Wisconsin

Western Distributor

C. B. BABCOCK CO., San Francisco, Los Angeles

R. M. C. Gas Burner



Durable Safe Economical

ROTARY MANUFACTURING CO.

5720 Long Beach Avenue Los Angeles, California

SOUTHERN UNION JOINS RANKS OF COMPANIES ASKING OMAHA PERMIT

A fifth firm which has made definite proposals to the Directors of the Metropolitan Utilities District of Omaha, for piping gas to that city, is the Southern Union Gas Company of Dallas, which proposes the construction of a line from the Permian basin fields. The estimated cost of the line would be $15,000,000, according to press reports.

Others who have made preliminary overtures to pipe gas to Omaha are the interests headed by Thomas R. Weymouth of Tulsa, the Utilities Power and Light Company, Chicago, the El Paso Natural Gas Corporation, and the Moody-Seagraves interests of Houston.

Omaha press reports also state the possibility of the Cities Service Company entering a proposal to come north with a line and state that the Central States Natural Gas Corporation may enter a bid.

Directors of the Metropolitan Utilities district of Omaha have gone on record as being against the sale of the city gas plant.

B. C. ELECTRIC RAILWAY CO. OPENS NEW APPLIANCE SHOWROOM

The British Columbia Electric Railway Company has opened a new showroom at Lonsdale Avenue, North Vancouver, B. C. This store is very similar in appearance, although on a much smaller scale, to the elaborate new gas and electric showrooms opened by the company in downtown Vancouver a year ago. There are ample facilities for demonstrating all lines of gas appliances. Vernon C. Sutton has been appointed supervisor of the merchandising department of this store. He comes to North Vancouver from Seattle, where he was with the Puget Sound Power & Light Company. Prior to that he was with the Jamaica Public Service Company, Ltd., Jamaica, British West Indies.

UNION PUBLIC SERVICE CO. OPENS NEW HIAWATHA OFFICES

Union Public Service Company, gas distributing company at Hiawatha, Kansas, celebrated the formal opening of its new office and salesroom on January 30. Gas had been turned into the city mains through a line constructed by the Cities Service Gas Company from Atchison, Kansas, to Falls City, Nebraska, a short time before the formal opening date.

The Hiawatha World, newspaper, published a special eight page gas section in its issue of the day before, carrying news and advertising about the formal opening of the company's new offices. J. B. Powell is manager of the Union Public Service Company, which is a Gas Service property.

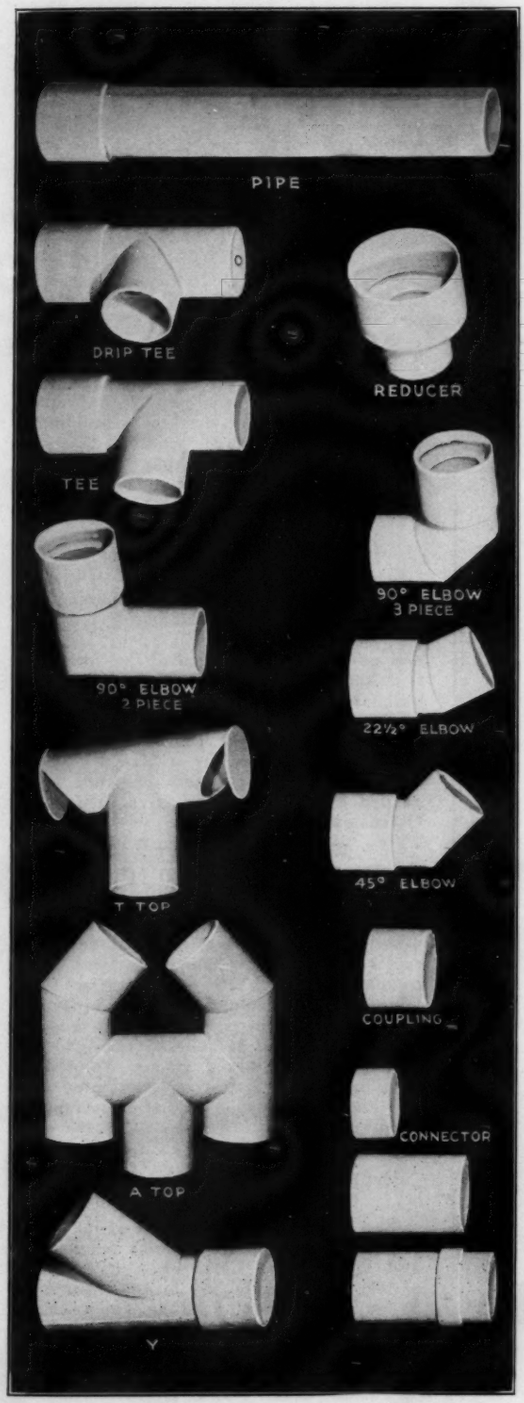
GAS APPLIANCES TO BE SOLD AT AVENAL, CALIFORNIA

Laying of gas mains at Avenal, California, was completed early in February by the Coast Counties Gas and Electric Company, and gas is now being served in that town. According to Pierre Vinet, new business manager for the company, a full line of gas appliance merchandise has been installed with the Cross Lumber Company at Avenal.

LATTNER BULLETIN ANNOUNCES CHANGES IN COMPANY'S LINE

Bulletin No. 125 of the P. M. Lattner Manufacturing Company announces several changes in the specifications in the company's line of automatic gas fired boilers. Copies may be had by addressing the company at Cedar Rapids, Iowa.

VITEX



The Light, Durable and Non-Corrosive Gas Vent and Flue Pipe— is Easy to Install— Increases Draft, Improves Combustion, and Minimizes Condensation.

For Fully Descriptive Catalogue Write To

PLANT RUBBER and ASBESTOS WORKS

537 Brannan St. San Francisco

The BARTLETT HAYWARD CO.
BALTIMORE *Engineers and Founders* NEW YORK

DESIGNERS AND BUILDERS
– OF –
COMPLETE COAL GAS PLANTS
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DE BROUWER CHARGING AND
DISCHARGING MACHINES
SALT WATER AND FRESH WATER
CONDENSERS
PURIFIERS
SHAVING SCRUBBERS
CENTRIFUGAL VERTICAL TYPE
SCRUBBERS
STEEL TANKS
VERTICAL WASTE HEAT BOILERS

GAS HOLDERS

IMUNOL

PITTSBURGH EQUITABLE METER CO. OPENS NEW TULSA BRANCH

Pittsburgh Equitable Meter Company, on February 15, held an informal reception at its new branch factory just completed at Tulsa, Oklahoma. A. J. Kerr, Mid-Continent manager for the company, officiated at the reception which continued through the afternoon and evening. L. H. Duncan, manager of the Pittsburgh Equitable Meter Company of Texas, with headquarters at Dallas, assisted Mr. Kerr.

About 300 field and office men identified with Mid-Continent companies visited the new plant during the reception. Dancing, card playing and a special program were features of the entertainment.

The Tulsa offices of the company, formerly located in the Kennedy building, are now established at the new branch factory, which is located near the Hale station of the Sand Springs Railway company, west of Tulsa. The factory, which is 50 feet wide by 150 feet long, is of brick and steel construction with the front of the building of white stucco.

WATSONVILLE, CAL., BOYS SCHOOL NOW USING NATURAL GAS

St. Francis School for Boys at Watsonville, California, was added to natural gas users of the Salinas valley, with the completion of an installation by the Coast Counties Gas and Electric Company. August Ringler, heating engineer for the company, had charge of the work.

The installation represented a problem, due to the fact that the school building is 400 feet wide with practically the same depth, and built in a "U" shape. There will be 47 units for heating the building, with provisions for eight more.

DOHERTY COMPANY BUYS MORE GAS AND OIL HOLDINGS

Announcement is made of the purchase by the Indian Territory Illuminating Oil Company, a Doherty subsidiary, of large oil and gas holdings in the Mid-Continent field from the Foster Petroleum Corporation. The purchase was largely confined to holdings in the Oklahoma City pool. At completion of this purchase, the Indian Territory Illuminating Oil Company will own leases on approximately 70 per cent of what is regarded as the most productive area in the Oklahoma City pool.

AIRPLANE USED TO DISCOVER LEAK IN TRANSMISSION LINE

During the recent cold weather, an airplane of the Continental Oil Company, played its part in discovering a gas leak in the company's 10-inch gas line serving Ponca City and other communities. The break was discovered by the occupants of the airplane after a flight of 15 miles. The gas leak which was causing a geyser-like disturbance in the dirt and snow, was noted as to location on a rough map, and later repaired by the construction crew.

BYLLESBY ENGINEERING DEPT. HOLDS ANNUAL MEETING

The fifth Annual convention of the engineering Department of Byllesby Engineering and Management Corporation will be held at the Congress Hotel, Chicago, March 24, 25 and 26, according to an announcement by H. W. Fuller, vice-president in charge of engineering and construction. John J. O'Brien, president of H. M. Byllesby and Company, will be a featured speaker on the program.

Sell HEALTH and COMFORT in HOME HEATING

Send for this Book

HERE is a new book just published in the interests of greater gas sales. You owe it to your gas company to send for this book—as it points out many ways of increasing the sales of home heating appliances, thus building the gas load. Have your secretary make a note to send for this book today. It will be sent you gratis.

EVERYONE wants health and comfort. They begin in the home. If the children are playing on chilly floors—if it takes till late in the day to warm the home—if the housewife has to do the furnace tending, then sell the home owner gas for heating.

You have a wonderful message for the housewife—and for every husband who really cares for the health and comfort of his wife and children. Why not sell them home heating by gas?

sell more GAS too...

And while the homeowner is enjoying the benefits of a gas heated home your gas company is selling more gas—is building the gas load, building greater profits!

Now in the Spring months is the time to concentrate your activities on home heating. Every home heated by gas increases the consumption of gas in that home 1000%.

Have your secretary send for the new book, "Sell Health and Comfort in the Home"—then begin reaping your profit reward thru greater gas sales.

ROBERTS CONTROLLED GAS HEATING UNIT

DUPLEX UNIT CONTROL GAS HEATING SYSTEM

ROBERTS-GORDON APPLIANCE CORPORATION

DELAWARE AVENUE AT TUPPER STREET

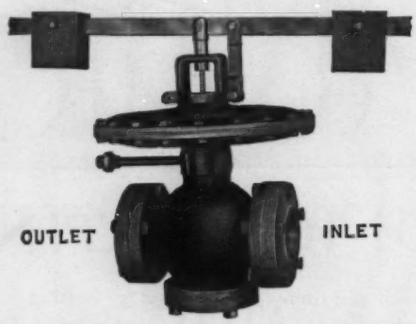
CURTISS BUILDING BUFFALO, N. Y.

For District or Individual Service—

The CF Weighted Illuminating Regulator

It is designed to reduce a medium pressure of 15 pounds or less to any given delivery pressure between one ounce and five pounds.

This is but one of the valves described in our catalog. Sent on request.



The Chaplin-Fulton Mfg. Co.

Organized 1884—Oldest Builders of Gas Regulators in the Country. Built in all Sizes From 1 Inch to 24 Inches; For All Service. 1 oz. up to 2,000 lbs. Pressure to Square Inch.

28-40 Penn Avenue **Pittsburgh, Pa.**

REPRESENTATIVES:

WESTCOTT & GREIS, Inc.
Sales and Service
Dallas — Los Angeles — Tulsa

JNO. W. CRAWFORD
Sales Engineer
1855 Industrial Street Los Angeles

Or Any Jobber

The healthfulness of Gas as fuel should not be overlooked. It is the most potent thought for us to develop in the mind of the Public. It will pay big dividends in better public relations and increased sales.

C. B. BABCOCK CO.

San Francisco Los Angeles

P. H. & F. M. ROOTS CO. NOW WITH STACY ENGINEERING

The P. H. & F. M. Roots Company, original patentee, and for 70 years manufacturer of Rotary positive blowers, pumps and meters, has merged with other interests and is now under the control of the Stacey Engineering Company of Columbus, Ohio.

The organization includes the P. H. & F. M. Roots Company and the Connersville Blower Company, both of Connersville, Indiana, The Wilbraham-Green Blower Company of Pottstown, Pennsylvania, and the Stacey Brothers Gas Construction Company of Cincinnati, Ohio. Formation of the corporation was completed August 31, as announced in the October issue of *Western Gas*.

Heading the list of officers, Colonel Carmi A. Thompson, of Cleveland, was elected president; Corwin Abbott, vice-president and general manager; Fletcher S. Heath, of Columbus, Ohio, vice-president; and Erle G. Meeks, secretary and treasurer. Charles T. Gordon will continue as general superintendent.

E. D. Johnston, who for the past 45 years has been connected with The P. H. & F. M. Roots Company, has resigned as president of the company and has retired from active business.

The new board of directors consists of Colonel Thompson, F. S. Heath and C. A. Ward of Columbus, Ohio; W. B. Stacey of Cincinnati; J. T. Wilkin, Corwin Abbott and Charles T. Gordon of Connersville.

All companies involved in the merger will maintain their separate identities and organizations, and will continue to operate separately until the final plans of the merger can be consummated.

MISSOURI-KANSAS PIPE LINE CO. TO INCREASE CAPITALIZATION

At a meeting held the middle of February, the stockholders of the Missouri-Kansas Pipe Line Company authorized an increase in their $5.00 par common stock from 700,000 shares to 5,000,000. The stockholders also voted 5,000,000 shares of Class B stock with a $1 par value.

The capitalization of the company formerly consisted of 10,000 shares of $100 par, 7 per cent preferred stock, none of which was outstanding, according to Frank P. Parish, president of the company, and 700,000 shares of common stock of which 416,199 shares were outstanding.

It was announced that dividends would be prorated proportionately between the regular and the class B stock.

COMPRESSOR HOUSE BEING BUILT BY B. C. ELECT. RY. CO.

The gas department of the British Columbia Electric Railway Company at Vanvouver, B. C., is building a brick compressor house at the Grandview gas holder station. This will be used to maintain the high pressure gas service in New Westminster, Burnaby, and Vancouver South areas, and to replace units now inadequate for the growing demand. The high pressure system of gas distribution is now being used by the company.

H. BOYD BRYDON, BYLLESBY ENGINEER, RESIGNS

H. Boyd Brydon chief mechanical engineer for Byllesby Engineering and Management Corporation, and affiliated with the Byllesby interests for 21 years, resigned his post with that company recently.

Mr. Brydon is a member of the American Society of Mechanical Engineers and of the Western Society of Engineers.

Build Load—Sales—Satisfaction

with MOORE'S Warm Air Circulating Gas Heaters

The ideal warm air circulating gas heater. Gas companies everywhere have found it a great good will builder and a profitable item of merchandise. Customers like it for it is

SAFE

A. G. A. approved. Has exclusive safety feature which makes it impossible to turn on main burner until pilot valve has been opened. Mica windows make flame inspection easy. Valves and valve handles behind drop door out of the reach of children.

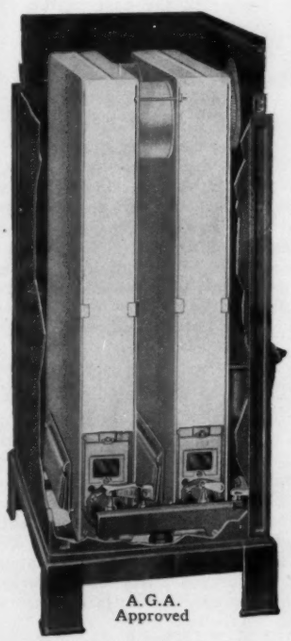
ATTRACTIVE

Three finishes—available in Mahogany Porcelain Enamel, Two-Tone Walnut Porcelain Enamel and Plain Finish. Designed to harmonize perfectly with every modern conception of home furnishings.

EFFICIENT

Keeps all the air in the rooms constantly moving. Heats by circulation. No cold corners in house heated by MOORE'S Gas Heaters.

Fully covered by Patent Pending



A.G.A. Approved

Sixteen Reasons Why—

MOORE'S WARM AIR CIRCULATING GAS HEATERS

Are the Logical Choice of Forward Looking Utility Companies

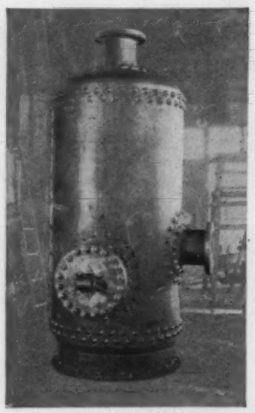
1. Designed and built by the originators of the warm air circulating heater.
2. Four sizes—Normal ratings 105,000 Btu.'s per hour, 70,000 Btu.'s per hour, 35,000 Btu.'s per hour, 20,000 Btu.'s per hour.
3. Three finishes—Two-Tone Walnut or Grained Mahogany, Porcelain Enamel, Plain Finish.
4. Long flue travel and condition of perfect balance between air inlets, outlets and heating unit capacity.
5. Keeps all the air in the rooms constantly moving.
6. Accident-proof; valve handles concealed. Does not scorch or burn rugs or floors.
7. Perfectly adaptable to thermostatic heat control either Robertshaw or Minneapolis.
8. Safe to light because burners light from pilots.
9. Humidity control keeps house perfectly healthful.
10. Valves, manifold, burners, instantly accessible.
11. Rust resisting inside construction insures long life.
12. Strong cast iron frame insures permanent rigidity.
13. Exterior design truly beautiful in its simplicity.
14. Glossy fused porcelain enamel finish is permanent.
15. True wood graining harmonizes perfectly.
16. Compact, occupies minimum floor space for its great heating and circulating capacity.

Write at once for full particulars of MOORE'S Warm Air Circulating Gas Heaters. Get the details of the Moore Francise, a profit maker for Utility Companies.

MOORE BROTHERS COMPANY

Cooking and Heating Appliances

JOLIET [SINCE 1857] ILLINOIS



RUGGED EQUIPMENT FOR RUGGED COUNTRY

THIS MIST-D-FIER SCRUBBER is all ready to be shipped to Kettleman Hills where high gas pressures call for extra heavy equipment.

Built for 65 million std. c. f.
Working Pressure, 450 pounds

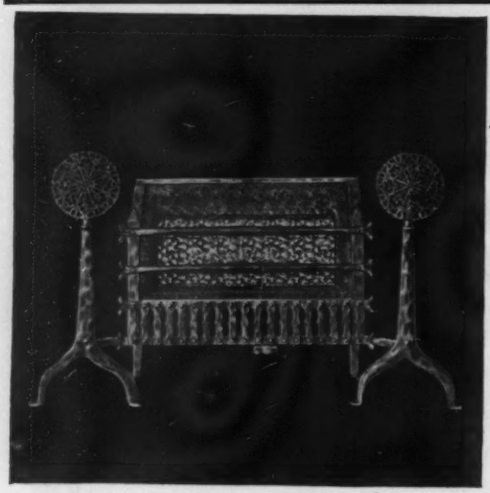
MIST-D-FIER scrubbers are built to work under all conditions, from 18" vacuum to 1000 pounds pressure. Remarkable extraction secured through entire range.

See working model at Oil Equipment and Engineering Exposition, Los Angeles, March 16-23, Booth 401 (outside). Ask for white-paper test.

Meanwhile send for Bulletin No. 6

J. A. CAMPBELL CO.
Natural Gas Engineers
CONSULTING PHONE-416-93
DESIGNING P.O. DRAWER 669
CONSTRUCTING LONG BEACH, CAL.

STEARNS-ROGER MFG. CO., DENVER
MID-CONTINENT AGENCY



The
HADDON HALL

Model 14-41. Retail price, 14 elements, $90. In 10 elements size, $70.

Write for catalog showing the Haddon Hall, and other models, in full colors. Or, a sample heater will be shipped for your inspection.

COMBINES the chaste beauty of wrought iron finish and solid bronze in a design of infinite grace and charm. The "HADDON HALL" is Guardian's finest example of authentic period designs.

THE GUARDIAN GAS APPLIANCE CO.
1364 East 47th Street Cleveland, O.

Guardian
FIREPLACE AND PORTABLE HEATERS

GAS UTILITY SALES INCREASE 11 PER CENT IN DECEMBER

The steady and persistent expansion in gas utility sales recorded during most of 1929 continued in December, which witnessed a gain of 11 per cent over the same month of the preceding year, according to Paul Ryan, chif statistician of the American Gas Association.

For the 12 months ending with December, these companies reported gas sales of over 446 billion cubic feet, an increase of nearly 10 per cent. Revenues from gas sales aggregated $418,831,103 for the year, representing a gain of 4.1 per cent. On December 31 the customers of these companies totalled 9,738,670, or approximately 2 per cent more than on the same date of the year previous.

When December gas sales are compared with the preceding month of Novmber, however, the gain was only 5 per cent, which is somewhat less than the usual seasonal increase from November to December. This slowing up in the final month of the year was most pronounced in the more highly industrialized states, and a reflection, in large part of the effects of the recession in general business and industrial activity at the time.

L.A.G. AND E. EMPLOYEES ASS'N. PRESENT SUCCESSFUL PLAY

"Forty-five Minutes from Broadway," the George M. Cohan musical comedy, was recently put on by members of the Employees' Association of Los Angeles Gas and Electric Corporation under the direction of L. H. Howell. The play met with such success that it was necessary to stage it for five nights running, instead of three as originally planned.

The production of a musical comedy has been an annual event for the L.A.G. and E. Employees' Association for several years, and, as usual, all of the talent for "Forty-five Minutes from Broadway" was recruited from among members of the employee body, including 24 people in the cast of the play as well as a 30-piece orchestra.

KANSAS PIPE LINE & GAS CO. BUYS AIRPLANE FOR SURVEYS

The Kansas Pipe Line & Gas Company of Salina, Kansas, has recently purchased an airplane which is to be used by officials of the company in making inspection trips over the gas system, embracing approximately 550 miles of pipe line. E. N. Duree is general manager of the company, which operates in central Kansas. The company has about 200 miles of system underway at the present time. It is a subsidiary of the North American Light & Power Company.

MISSOURI NATURAL GIVES SERVICE TO POPLAR BLUFF IN FEBRUARY

Missouri Natural Gas Company turned gas into its mains at Poplar Bluff, Missouri, early in February, through a lateral line extending from Mississippi River Fuel Corporation's Louisiana-St. Louis line. The Missouri Natural, subsidiary to the Utilities Power and Light Corporation, holding company for the Laclede Gas Light Company, was organized for the purpose of distributing gas to communities adjacent to the Louisiana-St. Louis line.

SOUTHERN CALIFORNIA GAS CO. ASKS TO SERVE CHOWCHILLA

Southern California Gas Company, with headquarters at Los Angeles, has applied to the California Railroad Commission for a permit to exercise franchise rights for the distribution of gas in the town of Chowchilla, in Madera County.

THE Erickson TEL-O-STAT

Illustration is two-thirds actual size.

This control makes gas the "economy" fuel

THE Erickson UNITROL

The Erickson Unitrol Package

This is the latest development in a moderately priced room thermostat with indicator to set for any desired degree of temperature and a signal light which tells when the furnace is burning. Maintains uniform temperature and saves gas.

The complete outfit consists of the Erickson Gas-o-trol Valve, Erickson Tel-o-stat, Special Erickson transformer, 25 feet of triplex wire and necessary staples. An instruction sheet accompanies every outfit and any mechanic can install it in a short time. Write for prices.

Pacific Coast distributors for

The "MINNEAPOLIS" HEAT REGULATOR

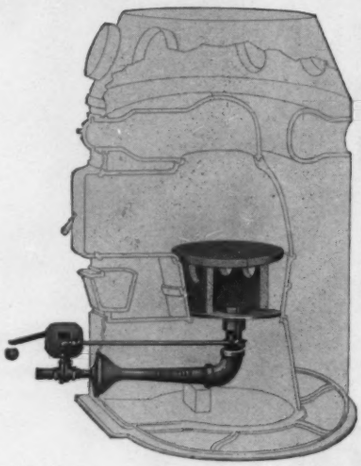
ARTHUR F. ERICKSON COMPANY

Selling Building	*557 Market Street*	*Terminal Sales Building*	*816 West Fifth Street*
PORTLAND, OREGON	SAN FRANCISCO, CAL.	SEATTLE, WASH.	LOS ANGELES, CALIF.

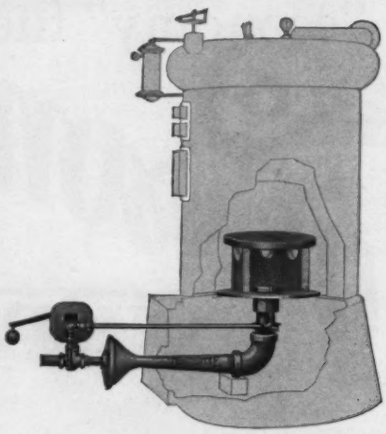
"SPECIALIZING EXCLUSIVELY IN AUTOMATIC HEAT REGULATION"

MAXON

Conversion Gas Burners



The above is an application to a warm air furnace. The burner is easily installed and the unit is fool-proof, making it a very dependable conversion unit for gas companies to recommend and sell.



This is an application to a round boiler. The burner is equipped with a snap-acting valve which can be attached to the existing furnace chain and manually controlled from upstairs. Either automatic or hand-controlled is recommended.

Pacific Coast Representative

The T. G. ARROWSMITH CO.
661 Howard St.
San Francisco, Calif.

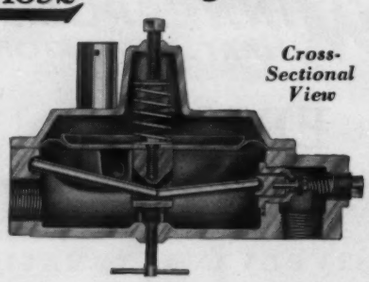
MAXON PREMIX BURNER CO.
INDUSTRIAL FUEL BURNING EQUIPMENT — FOR OIL OR GAS, OR BOTH COMBINED
MUNCIE — MAXON PREMIX BURNER — INDIANA

Reynolds
Gas Control Since 1892

Products for all kinds of Pressure Reduction—for either artificial or natural gas.
GOVERNORS—Intermediate Pressure, Triple Outlet, Holder, Toggle Type Street.
REGULATORS—High Pressure Service, Low Pressure Service, High Pressure Line, Single and Double District Station.
VALVE—Automatic Quick Closing Anti Vacuum.

Reynolds Gas Regulator Company
Anderson, Indiana

Reynolds Little Giant Regulator



Cross-Sectional View

FLUOR CORP. OFFICIALS VISIT MID-CONTINENT FIELD

J. S. Fluor, Jr., assistant general manager, and Hugh R. Lamberth, of the Fluor Corporation, Limited, Los Angeles, California, manufacturer of Fluor redwood cooling towers, recently returned to the home office after a three weeks' tour of the mid-continent field, where a large number of Fluor cooling towers are now in service. They visited Tulsa, Dallas and Houston for the purpose of calling on customers in the Mid-Continent territory; to inspect installations in adjoining fields; and to instruct salesmen in the Mid-Continent on all points and details in connection with the new Fluor cooling tower which was announced and placed on production for the first time at the beginning of the year. A number of features have been incorporated in this new design which are said to improve distribution and better the cooling performance. According to Mr. Lamberth, the Fluor Corporation has installed in excess of 1,500 linear feet of this new type tower since January 1, 1930.

MISSISSIPPI RIVER FUEL CORP. HAS LARGE INDUSTRIAL LOAD

The Mississippi River Fuel Corporation has recently closed industrial contracts for an aggregate of 30,000,000 cubic feet of natural gas daily. The Owens-Illinois Glass Company, Alpha Portland Cement Company, Granite City Steel Company, Aluminum Ore Company and the Pittsburgh Plate Glass Company, are among the large users being supplied with the gas.

The Standard Oil Company of New Jersey, United Gas Company, Electric Bond & Share Company, and other interests recently completed the 526-mile pipe line from the Louisiana fields to St. Louis. The line is operated by the Mississippi River Fuel Corporation.

DES MOINES GAS COMPANY TO INCREASE YEARLY OUTPUT

According to a recent statement made by C. A. Leland, Jr., vice-president of the Des Moines Gas Company of Des Moines, Iowa, the company has authorized expenditures for 1930 which will increase the manufacturing capacity of the plant to 1,000,000,000 cubic feet per year. The chief item for which expenditures have been authorized is a new water gas unit which will be installed at the present plant.

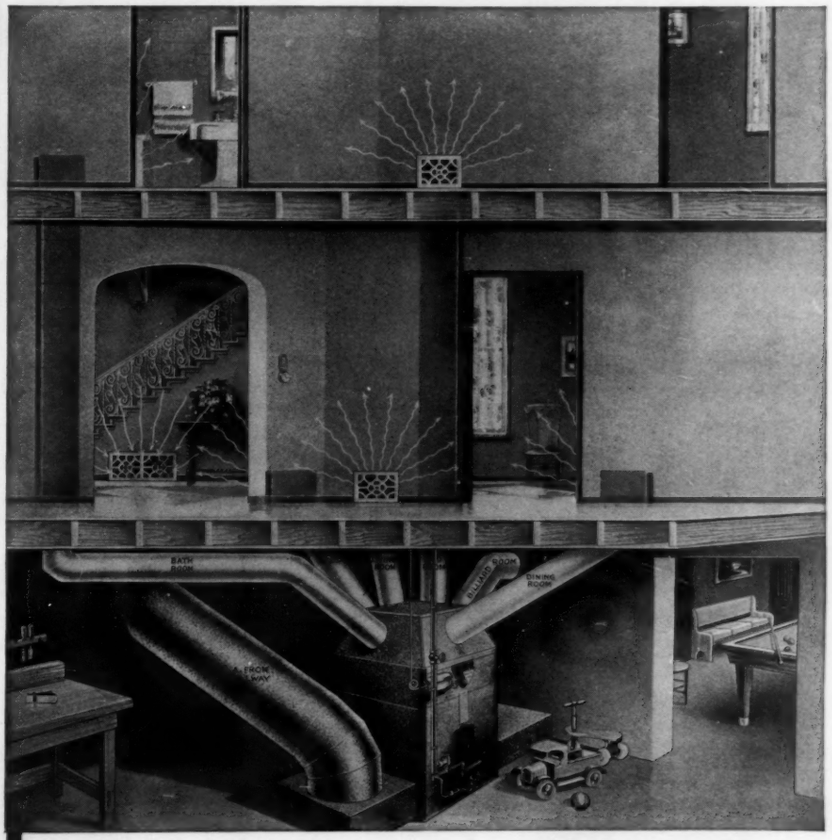
APPLICATION FOR SERVICE MEDAL MUST BE MADE BY APRIL 15

Applications for the Meritorious Service Medal must be filed at American Gas Association headquarters on or before April 15. This award is offered each year by the Association to an employee of a member company for the most noteworthy act in saving either human life or property. The award consists of a gold medal and button, and a certificate setting forth the act of heroism.

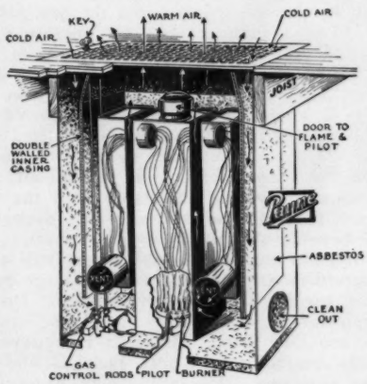
COLORADO INTERSTATE BUILDING NEW BOOSTER STATION

Colorado Interstate Gas Company, operating the Amarillo-Denver natural gas transmission line, is constructing a 5,000 horse power compressor station at Devine, Colorado. The booster station will be built at a cost of $600,000, and construction work will be done under the supervision of Ford, Bacon, & Davis, engineering company. A similar plant will be built at Clayton, New Mexico.

A NEW Gas-Fired Heating Plant for Old and New Homes...

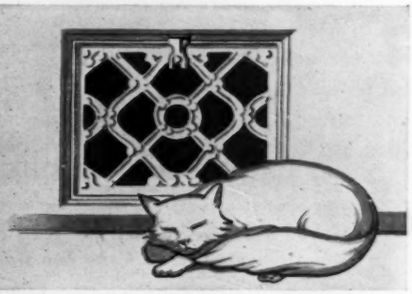


As an auxiliary to the main heating plant in large dwellings, factories, auditoriums—or the main source of heat in cottages, offices, stores, banks, hospitals, clubs, flower shops, churches, schools and cafes—Payne Floor Furnaces have unlimited possibilities. Installed without heat pipes. No basement required. Constant and automatic air circulation supplies all the warmth required and, besides, keeps the air fresh, pure and healthful. Write for folder 217-B.



SAVE the old heat pipes! . . . Tear out the old oil, coal or wood burner! Install this new, modern, high-efficiency gas-fired heating system—for greater comfort, convenience and economy! In new homes, too, where heat is distributed from one source, Payne Central Furnaces afford marked economies in installation—give the highest standard of performance yet achieved—*all at surprisingly low cost!* Write for Bulletin 6-B giving full particulars.

PAYNE GAS FURNACES



Dealers

The Payne Gas Furnace Franchise for your town may be open. Write today for new Catalog and Proposition!

PAYNE FURNACE & SUPPLY CO., Inc.

Beverly Hills, California

There is a "Payne Heat" System for Every Building and Climate!

Payne Heat

Factory Units
Unit Furnaces
Floor Furnaces
Central Furnaces
Pipeless Wall Units
Industrial Installations

An Automatic Water Heater In Every Home

The TROOPER Automatic Storage Heater

will enable you to bring this about.

It can be sold to your customers for as low as **$55.00,** with a fine profit for yourself. Its low price will attract customers and its high quality will make the sale.

Notice these features never before offered in a low-priced storage heater:

Heavy COP-R-LOY Tank,
Automatic Safety Pilot,
Guaranteed accurate Thermostat,
Heavy Insulation,
Brass Water Connections,
Ivory Enamel Finish.

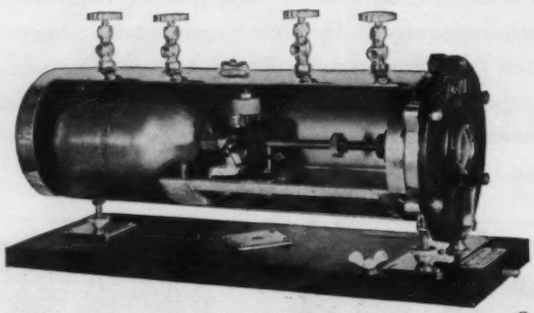
TROOP WATER HEATER COMPANY
Pittsburgh, Pa.

Southern Office & Warehouse,
2625 Elm St., Dallas, Texas.

Branches in all Principal Cities.

The Improved AC-ME Gas Gravity Balance

Gives Accurate Consistent Results



Is Easily Portable in the Field

Adopted by the Natural Gasoline Association as the means for determining the specific gravity of Natural Gas

Ac-Me Specialties Mean AC-curate ME-asurement
Write for Bulletin No. 14

Largest Scientific Material House in Southwest

THE REFINERY SUPPLY COMPANY

621 E. 4th St.
Tulsa, Okla.

3404 Main St.,
Dallas, Tex.

Gas *for the* Industries Holding *the* Load

FOLLOWING is an extract from A. F. Mitchell's paper on "Gas for the Industries—Holding What We Have," delivered at the American Gas Association's 1929 convention.—EDITOR.

WHY should the industries be serviced and what are some of the vital points of this class of work? We advertise gas as being clean, easily controlled and dependable and this is true in a large measure. However, it is not quite as simple to handle as, let us say, water or air under pressure. It does require some attention from the time it enters the customer's premises until it is burned in the appliance. The amount of attention or service to be given will depend upon many things. The first thing we think of in connection with servicing is the possible overloading of the main supply lines; gas in quantity and at sufficient pressure must be available at the furnaces.

Burner equipment may be of the best and in perfect condition when installed but later on lead from the pipe joints or scale from the inside of lines may clog up the burner orifices. This requires attention.

Leaks may occur at the pipe joints or valves due to constant vibration or use. This may happen underground and can be detected only at the meter when appliances are not in use.

In many industrial plants the atmosphere contains more or less dust and sometimes this dust contains oily vapors. This mixture settles in the mixture tubes, gradually clogging them up, resulting in a too rich gas-air mixture, lowering the flame temperature, increasing the time or cycle of operations and, last but not least, increasing the gas bill.

When a furnace does not operate as it should the operator often starts in to "fix it" and he generally does "fix it." The difficulty often encountered is that the temperature is lowered or production is slowed up. He knows that more heat is required and that to him means only more gas. Therefore, he starts reaming out orifices and adjusting everything adjustable until the furnace, from all indications, would appear to be burning a poor quality of fuel oil.

Regular inspections of furnaces will eliminate these troubles at least in a large measure, keeping the customer satisfied. Do not wait for the customer to complain. It may be too late then. The man that pays the bills generally sees only the bill and not the appliance. His attitude resulting from increasing costs will be that gas is too expensive. Service day or night, on the spur of the moment, should be the slogan to hold the load on the lines.

GAS DEPARTMENT OF B. C. ELECT. REPORTS SALES ACTIVITY

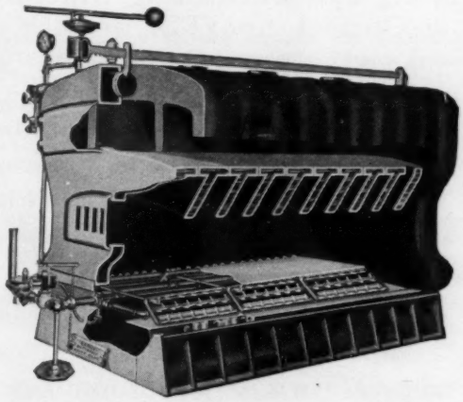
During the closing two months of 1929, the gas department of the British Columbia Electric Railway Company sold 101 gas ranges on the lower mainland of British Columbia. During the same period the company sold 71 hot plates, 43 tank heaters, 16 auto water heaters, 261 gas fires, 12 gas furnaces, five radiators, 14 industrial burners, two vacuum systems, 21 kitchen heaters, 24 Heatrolas, one bake oven, one gas refrigerator, and a miscellaneous group of minor gas appliances valued at $600. The total value of all gas appliances sold in November was $17,737.36, while in December sales totalled $11,413.10.

BARBER *Automatic* JET GAS BURNERS

Are Unexcelled for Conversion Work

The above type Burner is supplied in four standard sizes for round Furnaces and Boilers having grate diameters from 16 to 31 inches, inclusive.

Illustrating installation of No. 300-R Barber Automatic Burner in a round Hot Water or Steam Boiler



Illustrating installation of a Special Barber Automatic Burner Assembly in Rectangular Boiler, with application of Upper and Lower Baffles.

The test of over twelve years' service has proven the merit and superiority of Barber Conversion Burners. Their present state of simplicity and perfection is the result of constant research and development during these years.

Barber Automatic Conversion Burners build your house heating load quickly because the initial cost is within the reach of the average home owner and the operating cost compares most favorably with an all new equipment installation.

Why allow your house heating prospects to delay changing from coal or oil to GAS because of the first cost? Send us today the name and number of the Furnace or Boiler of a few of your prospects. We will specify and quote you on proper Barber Gas Burner Equipment which will enable you to sell the majority on the idea of starting NOW to heat with GAS.

The CLEVELAND GAS BURNER & APPLIANCE CO.
Burner Specialists
3702-04 Superior Avenue, Cleveland, Ohio

WATER
or
GAS
Connections

whether screw thread or gasket, should be made up with KEY TITE PIPE JOINT COMPOUND.

KEY TITE PIPE JOINT COMPOUND is not a quick hardening cement, but a plastic lubricant and a filler that will seal the most obstinate joint with ease. It covers more surface than an equal volume of red or white lead, thereby reducing the cost. It is waterproof—and there is no waste.

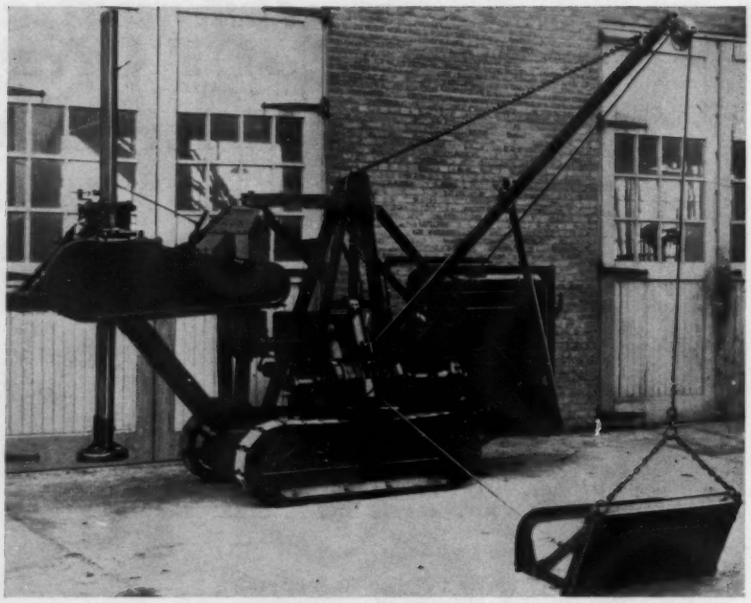
Manufactured by

E. A. Key Co., Inc.

2814 Santa Fe Ave.
Los Angeles, Calif.

Distributors in all principal cities.

WRITE FOR FREE SAMPLE



Combined Tamping *and* Backfilling Machine

THE Cleveland Trencher Company of Cleveland, Ohio, has announced a new machine which combines the related operations of tamping and backfilling.

The Cleveland tamper-backfiller is 58 inches in extreme width, and is mounted on full crawler tracks for ease of handling, as well as to enable it to travel over rough ground, across excavations etc.

The tamping mechanism, which will work either at the center or side of the machine, consists of 150-pound steel tamping head which can be dropped 45 times per minute from a height of 26 inches. Gearshift speed changes provide means of determining the number of blows struck per given distance according to the requirements of the soil.

Backfilling and tamping speeds of 3½, 7 and 11½-feet per minute are available and the unit has a road speed of 5 miles per hour.

The backfiller operates with a telescopic boom with a length which can be varied from 14 feet 2 inches (telescoped) to 20 feet 2 inches (fully extended). The entire unit is self-contained and is powered by a four-cylinder Hercules model OX-gasoline motor.

UNITED ENGRS. AND CONSTRUCTORS ANNOUNCES 19 PER CENT GAIN

United Engineers & Constructors, Inc., comprising The U. G. I. Contracting Company, Public Service Production Company, Dwight P. Robinson & Company, Inc., and Day & Zimmermann Engineering & Construction Company reports $81,600,000 of engineering and construction work completed during 1929, an increase of 19 per cent over 1928 operations, according to the annual report of Dwight P. Robinson, president. The value of contracts on the books as of December 31, 1929 was $130,500,000 compared to $129,700,000 the year previous.

CHARLES RUMMEL, B. C. ELECT. DIVISION MANAGER, DIES

Charles Rummel, Fraser Valley manager for the British Columbia Electric Railway Company, died recently after a lingering illness. Mr. Rummel had been with the company for 37 years and rose from the ranks to become manager of the entire rural territory of the company on the lower mainland of British Columbia. He also supervised the gas, light and power operations of the company in the city of New Westminster, B. C., and the municipality of Burnaby. He has been succeeded by Fred Yates, who joined the company as a meter reader in July, 1911.

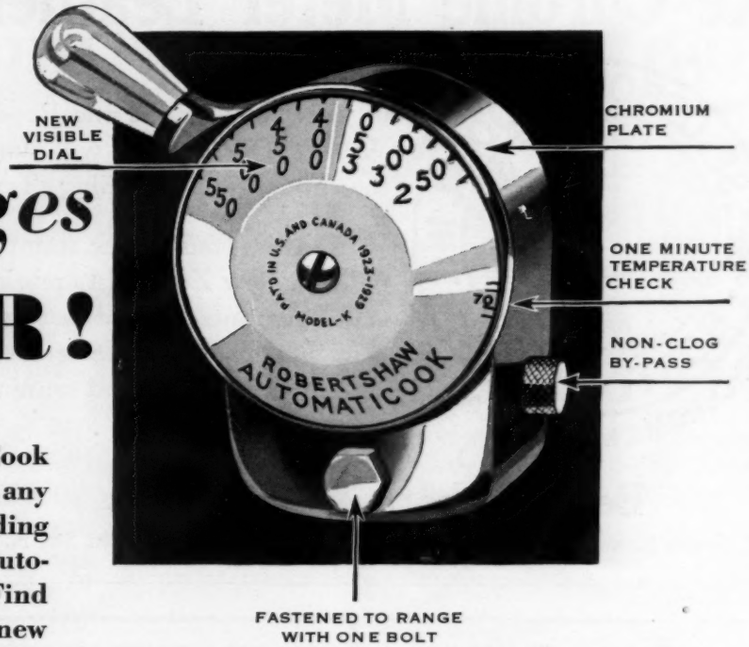
WM. MAJOR, OLDEST EMPLOYEE OF VANCOUVER GAS CO., DIES

William Major, employee of the Vancouver Gas Company for the past 39 years, and oldest worker on its payroll, died recently. Before coming to Vancouver Mr. Major was employed by the Gas, Light & Coke Company of London, Eng., from 1878 to 1883. In that year he went to Ottawa and operated the gas plant there until 1884, when he returned to his old post for a further five years, following which he came out to Toronto and worked in the gas plant there for a number of years. In 1891 he joined the staff of the Vancouver Gas Company.

CONNERSVILLE BLOWER COMPANY ANNOUNCES PERSONNEL CHANGES

At a recent meeting of the board of directors of The Connersville Blower Company, Inc., John T. Wilkin, president and chief engineer, was chosen as general manager, also. At the same time, Bernard C. O'Brien, formerly in charge of sales in Pittsburgh, was elected secretary; W. E. Newkirk, purchasing agent, became treasurer, and E. C. Hassler, assistant superintendent, was appointed acting superintendent. The last three selections were to fill vacancies due to the deaths of J. E. Huston, secretary-treasurer, and R. T. Huston, vice-president and superintendent.

The NEW "K" *Type* AutomatiCook *is selling Gas Ranges* FASTER!



THE new "K" Type AutomatiCook is a definite selling point on any range. And more than 100 leading makes of gas ranges will be AutomatiCook equipped this year. Find out the selling arguments of the new AutomatiCook—*now!*

It's smaller, more compact, better looking. Chromium plated. A full vision dial. An absolutely foolproof One-Minute Temperature Check. A non-clog by-pass. Only *one* bolt secures the AutomatiCook to the range. The AutomatiCook is so designed that temperature setting, calibrating and all working parts are accessible from outside the range.

Study up on the new AutomatiCook, now. Write for our descriptive literature. We'll be glad to send this literature to your salesmen and service men, too. Just send us their names. But write *now*—if you want to make selling of gas ranges easier this year!

ROBERTSHAW AutomatiCook

ROBERTSHAW THERMOSTAT COMPANY
Youngwood, Penna.

PLAY SAFE!

By Specifying and Using

"COLONIAL" BRAND

Re-Chrome Meter Leather

BESSE, OSBORN & ODELL INC. · COLONIAL BRAND · BOSTON, U.S.A. · RE-CHROME METER LEATHER

in your New Meters and Repair Work. This Leather will stand the Five-Minute Boiling Test.

This Trade Mark stamped on each New Zealand Lambskin is our guarantee to you that each skin has received the greatest care in its selection and tanning.

Besse, Osborn & Odell, Inc.

51 South Street, Boston 177 William St., N. Y.

THE BABY DIGGER

The Ideal Modern Way To Dig Gas Trench!

Cleveland Baby Diggers are unequalled for downright usability and trenching satisfaction. Compact — transportable — economical. Tough — fast — dependable. Precision built of finest materials. A wheel type trencher on full crawlers. You'll find Cleveland Trencher pioneering the features that count. Write for particulars.

THE CLEVELAND TRENCHER COMPANY

"Pioneers of the Small Trencher"
20100 St. Clair Ave.
Cleveland, Ohio, U. S. A.
Edward R. Bacon Co., 17th at Folsom Sts.
San Francisco, Cal., Distributor

California Oxide

GAS Purification Requirements can be most efficiently cared for through the additional and improved facilities of our new plant in Southgate.

Both Maas and McKee Oxides have met gas purification requirements of the Pacific Coast over a period of several years and merit your investigation.

California Oxide Co.

308 East Eighth Street
Los Angeles

TRinity 0769

MERCO-NORDSTROM ANNOUNCES SLOGAN CONTEST WINNERS

INDICATING the intense interest aroused by the recent slogan contest held by the Merco-Nordstrom Valve Company, 11,275 slogans were received by the manufacturer over a period of approximately 60 days, according to H. S. Shuey, secretary.

The company offered $500 in prizes for the best slogans pertaining to Nordstrom valves, and contributions were received from every state in the Union and several hundred from foreign countries. The majority of slogans were sent in by employees and officials of industrial concerns.

Each slogan entered was read by the jury of awards and given consideration. Nineteen were finally selected for the prizes. The Grand award was given to J. L. Pillow, of the Standard Oil Company, Baton Rouge, La., who contributed the following slogan: "Nordstrom—the Perfect Application of a Principle."

The second award was made to G. E. Genung, 13326 Terry Ave., Detroit, Mich., the slogan being "Hydraulic Lubrication Insures Effective Manipulation."

The remaining 17 slogans selected, in order of their preference, were as follows:

"Fabricated and Lubricated for Long Life"—G. C. Bemis, Jr.

"Won't Leak, Won't Stick, Lubrication Does the Trick"—T. S. Barlow.

"The Valve Controls the Flow, the Screw Controls the Valve"—Henry A. Webber.

"The Turn of a Screw Pushes Lubricant Through"—Hal D. Draper.

"Nordstrom's Perfection Is Your Protection"—Russell Egbert.

"For Those Whose Goal Has Been Control"—Arthur Atkins.

"Nordstrom's Lubricated Action Is the 'Seal' of Satisfaction"—S. St. Claire.

"Bringing Pressure to Bear on Valve Troubles"—Albert S. Eggleton.

"Will Stand the Strain on Any Main"—Fred J. Maples.

"Simple to Lubricate, Easy to Operate"—G. W. Martindale.

"They Lubricate as They Operate"—Edith M. Bell.

"Loosened and Tightened by Lubricant"—L. D. Nicolson.

"Where Nordstroms Go In, Troubles Go Out"—E. J. Shaunce.

"With Every Connection Comes Your Protection"—C. G. Schram.

"Once Installed Never Stalled"—Charles W. Smith.

"Made Their Way by the Way They're Made"—E. D. Murphey.

"Satisfaction at Every Turn"—Clair Wilkes.

APPLICATIONS FOR GOVERNMENT POSTS NOW BEING FILED

Applications for the posts of assistant geologist and junior technologist are being received by the United States Civil Service Commission at Washington, D. C.

The position of assistant geologist carries an entrance salary of $2,600 per year, and that of junior technologist, $2,000 per year. Higher positions are filled by promotion. Application for the latter post must be filed by April 8, and for former, by March 12.

FLUOR CORPORATION TO ENTER EXHIBIT AT EQUIPMENT SHOW

Fluor Corporation, Ltd., of Los Angeles, California, manufacturer of Fluor redwood cooling towers, plans to enter an exhibit in the Oil Equipment and Engineering Exposition to be held in Los Angeles, March 16-23. The company will show a model cooling tower of the new type, which will be a replica of the Fluor standard models.

One Special Salesman Adds 589,500 FEET to monthly domestic load

In 6 months, Birmingham Gas Company's special Electrolux salesman builds 393 domestic accounts into valuable, permanent profit-makers.

A tiny gas flame takes the place of all moving parts

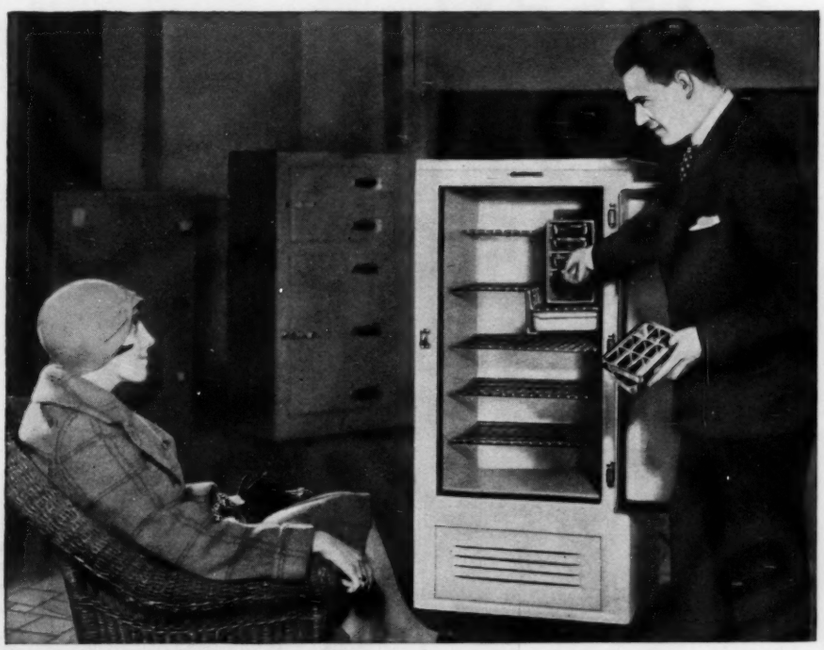
DOES it pay to put a salesman on the special job of selling Electrolux exclusively?

Let the experience of the Birmingham Gas Company answer the question. From May 27 to November 23, 1929, the head of the refrigeration department of this company sold 393 Electrolux refrigerators.

The average increase in billing from Electrolux is 1500 feet per month. This means that in less than six months one capable man permanently increased the monthly domestic load of his company by approximately 589,500 cubic feet . . . and earned for himself and the company a generous profit on every sale.

Progressive gas companies are discovering the greatly increased profits that result from one or more salesmen exclusively for Electrolux. They know that gas refrigeration transforms small domestic accounts into valuable profit-makers . . . builds up the off-hour load . . . creates new prestige for the gas industry.

There's an unlimited market for automatic refrigerators in your community. How much of this rich market will be turned into increased gas load and gas company profits depends in large part upon your efforts. Every month, we're telling millions of women about the matchless economy, silence and dependability of Electrolux in national magazines like Saturday Evening Post, Good Housekeeping, House & Garden. And we have a wide variety of effective sales and merchandising helps—useful in making contact with architects, builders, owners and housewives. Ask us about them today. Write, wire or telephone Electrolux Refrigerator Sales, Inc., Evansville, Indiana.



ONE SPECIAL SALESMAN for Electrolux can greatly increase the domestic load.

ELECTROLUX

THE *Gas* REFRIGERATOR

EMPIRE
Oil Meters

Positive Displacement Oscillating Piston Type

Simple in Construction—Easy to Operate—Low in Cost of Maintenance

EMPIRE meters are highly accurate, and stay accurate. They are invaluable for cracking and absorption processes; for gas companies; for refiners and distributors of gasoline and all distillates of petroleum; for measurement of crude oil, cold or hot.

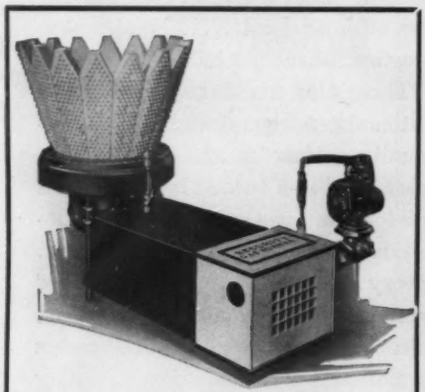
ALL SIZES ⅝" TO 6"

Standard meters will withstand working pressures of 150 lbs. to the square inch. High pressure types will handle 325 lbs. Higher pressures and special types to order.

National Meter Company

299 Broadway, New York

1048 Folsom Street, San Francisco **2309 E. 8th Street, Los Angeles**



We Manufacture a Full Line of Strictly

High Grade Gas Appliances

Including

Conversion Gas Burners
Circular Heaters
Warm Air Furnaces
Gas Ranges

Our Catalog is yours for the asking

SECURITY STOVE & MFG. CO.

Kansas City, Mo.

SOUTH CHESTER STEEL PIPE

Excels for Gas Service

The unusual care given to accuracy of diameter and welding qualities, makes Chester Pipe a favorite for gas lines.

SOUTH CHESTER TUBE CO.
Chester, Pa.

Classified Advertising

Classified advertising five cents per word; minimum $2.00 per insertion. Situation Wanted advertisements up to 50 words will be published three consecutive issues without charge. Small professional cards 1-in. deep by 21 ems wide are $5.00 monthly on 12-time contract.

SITUATION WANTED—MALE

A sales representative of a public utility seeks a change wherein he can find a greater opportunity. The applicant has had a well rounded business career, including office management, finance and sales. Address Box E-21, care of *Western Gas,* 124 West Fourth Street, Los Angeles, California.

WANTED—Position as sales manager. Experienced in gas appliance merchandising. Have promoted, organized and managed merchandising department for two large gas utilities, and have had more than 10 years experience in the gas business. Will go anywhere. Address Box E-20, *Western Gas,* 124 West Fourth Street, Los Angeles, California.

BORDER CITIES GAS CO., TO MAKE BUTANE GAS AT KERRVILLE

The Border Cities Gas Company has been granted a gas franchise at Kerrville, Texas, for the distribution of butane gas. The base material, liquid butane, will be shipped to the city from Oklahoma refineries in 10-car lots. A plant will be constructed in Kerrville at a cost of approximately $50,000, according to report.

The 25-year gas franchise was issued to Joe Burkett, identified with the Border Cities Gas Company. About 16 miles of pipe will be laid within the city, and several miles adjacent to the town.

NEBRASKA NATURAL APPLIES FOR PERMIT TO SELL STOCK

The Nebraska Natural Gas Company has applied to the state railway commission for authority to issue $500,000 in common, and $1,000,000 in preferred stock and an equal amount of bonds.

J. J. FERRARI TAKES PLACE OF J. T. SULLIVAN

J. J. Ferrari has been named superintendent of the gas and water department of the Sierra Pacific Power Company, with headquarters at Reno, Nevada, taking the place of J. T. Sullivan, who has been made manager of the Norfolk City Gas Company of Norfolk, Virginia.

GRAND JUNCTION GRANTS GAS FRANCHISE TO FULTON

Grand Junction, Colorado, has granted a franchise to the Fulton Petroleum Company for the service of natural gas in that city. Twenty-six miles of pipe line will be laid from the Garmesa Dome north of Fruita, Colorado.

EXACTLY THE BOILER

...for Closed System Processes!

"Steam in 4 minutes"

Ofeldt

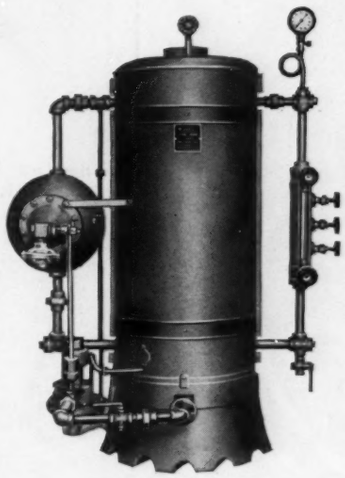
TRADE MARK

—Because the Ofeldt Boiler is automatic, gas-fired, clean, compact, quick-steaming, and simple to operate.

—Because the Ofeldt eliminates long inefficient pipe lines, and solves fuel or ash handling and storage problems.

—Because it burns gas only in proportion to the steam withdrawn for processes, and maintains constant pressure, with adequate volume under load.

A complete range of sizes up to 25 H.P. enables you to select the size best suited to an especial process requirement. Write the nearest branch office for details.



WATER TUBE

GAS BOILER

Ofeldt Boilers are used by

Bakers, Dairies, Chemical Laboratories, Hotels, Restaurants, Candy Manufacturers, Hat Renovators, Electrotypers, Nickel Platers, Sterilizers, Vulcanizers, Laundries, Hospitals, Food Industries, Cleaners & Dyers, etc.... wherever clean process steam at constant pressure is needed.

New York—9 Park Place
Boston—100 Arlington St.
Chicago—363 W. Erie St.

MEARS-KANE-OFELDT INC.
1903-1915 EAST HAGERT ST. PHILADELPHIA

Buffalo—Walbridge Bldg.
St. Louis—2010 Locust Blvd.
Birmingham—Am. Trust Bldg.

Manufacturers of Gas Boilers • • Water Heaters

Reliance Regulators

House Type
High Pressure Balanced Valve
Low Pressure Balanced Valve
High Pressure Compounding
Propane, Butane or Bottled Gas

The Reliance Line now includes a regulator for every purpose in sizes up to six inches, all embodying their patented toggle joint action. Fifteen years experience has proven conclusively that for positive lockup, sensitive and close regulation, great capacity and low cost of upkeep, this device has no equal.

Reliance Manufacturing Co.

Alhambra, California

WEBSTER
Radiant Gas Burners

A TELEGRAM—
urged us to come--but

when we got there, the job was not ready for firing — wouldn't be for two days. Did that stop us — not in the least!

Our service man goes to work—cuts the pipe, hooked them up and had the boiler fired inside of ten hours!

There was no charge for this service, just a way we have of helping the other fellow. Again—everyone was satisfied—the railroad company that bought the Webster Radiant Gas Burner, the Gas Company that sold it and we because we've made another satisfied Webster booster.

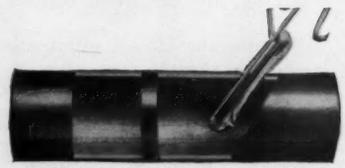
If you are not fully acquainted with Webster Radiant Gas Burners, have us send you complete information now!

The Webster Engineering Co.
TULSA - OKLA.
Boiler Burner Division of
The Surface Combustion Co.
Subsidiary of Henry L. Doherty & Co.
2375 DORR STREET TOLEDO OHIO
Branch Offices in All Principal Cities
Member of Industrial Furnace Manufacturers Association

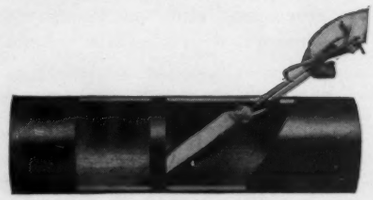
How to Use the Goodman Stopper

Four Easy Steps

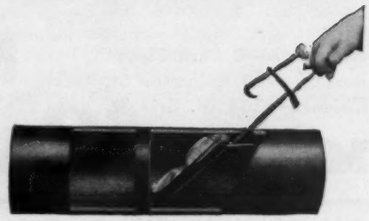
Insert in Tap like this



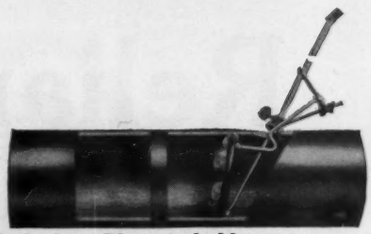
Turn to Right like this



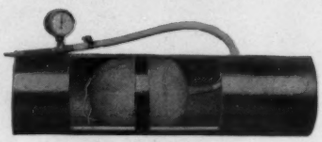
Engage Z Handle in Tapping. Pull long Handle to you



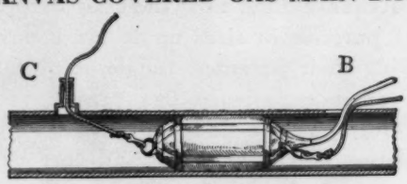
Lower Locking Sleeve and lock in Place like this



When locked in Place it holds



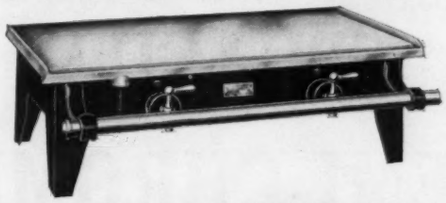
TYPE "C"
CANVAS COVERED GAS MAIN BAGS



CYLINDRICAL STOPPERS

Safety Gas Main Stopper Co.
523 Atlantic Avenue Brooklyn, N. Y.
Cable Address: Gastopper, N. Y.

Wedgewood



2 and 3 Burner Griddle Hot Plates

Special large griddles, ground and polished, with grease groove along front. Loop burners and extra heavy stamped steel body and legs.

Pastry Ovens

Single or double ovens for roasting and baking. Steel and heavier gauge sheet-iron, with bar-iron legs. Heavy doors and reinforced hinges. Double tubular burners and Toncan oven linings.

These pastry ovens can be equipped with oven heat control.

Restaurant Gas Range

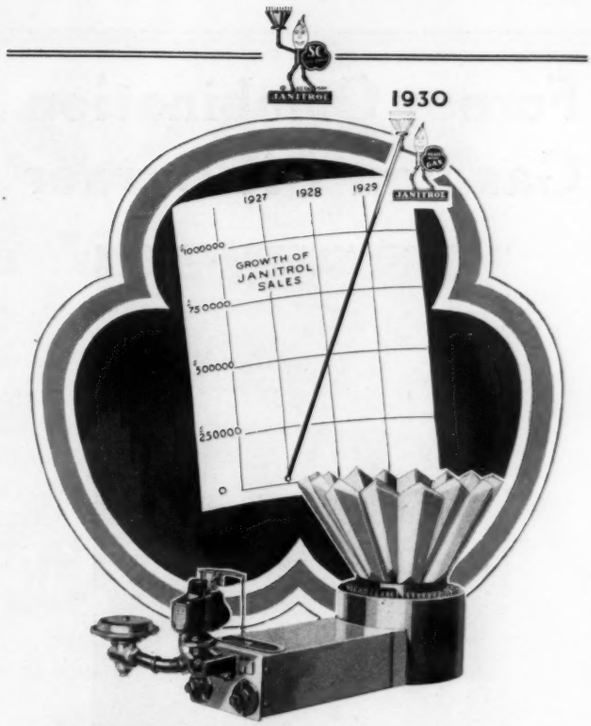
With or Without High Shelf

The special features of the Wedgewood Restaurant Gas Ranges are the extra large cooking tops, larger and heavier top gratings, heavy doors and reinforced hinges and heavier gauge sheet iron used in their construction.

James Graham Manufacturing Company

Largest Stove Manufacturers in the West
The all-inclusive Gas Line
Since 1882

San Francisco — Los Angeles
Newark, Calif.



JANITROL Sales Increase 120% in 1929

This acceptance of **Janitrol** proves it to be a practical and profitable means of educating home owners to the advantages of gas as a fuel.

Janitrol does give satisfaction. It is not merely a conversion burner, but a carefully developed, correctly engineered, thoroughly tested, rightly built, fully automatic gas burning unit on which more than **twenty thousand home owners** have placed their stamp of approval.

Eventually, Janitrol users become prospects for a complete gas fired job. The cleanliness, comfort and convenience of gas as a fuel becomes so essential that the change is but a matter of course.

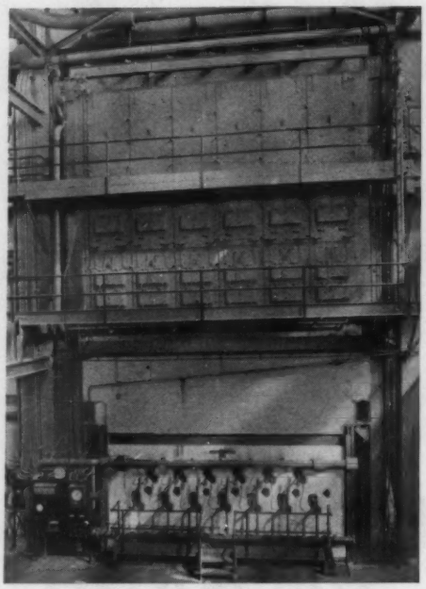
Now, that is the mission of Janitrol—to create a more general acceptance of gas as a fuel; to build up a future demand for complete installations of gas fired equipment, and to make every domestic meter a profit producer for you.

Right now, folks are tired of shoveling coal—it is the time to push up the profit line with Janitrol. We will help you do this. Write for the Spring Merchandising Plans.

The Surface Combustion Co.

INCORPORATED
Subsidiary of Henry L. Doherty & Co.
2375 DORR STREET, TOLEDO, OHIO
Branch Offices in All Principal Cities
Mantle Recuperator Division — Webster Engineering Co.
Member of Industrial Furnace Manufacturers Association

Forney Combination Gas and Oil Burner



A 1700 H. P. Boiler using Forney Combination Gas and Oil Burners. These burners develop 400% boiler rating with perfect ease and flexibility.

Properly Designed and Applied Burners Are Essential to the Success of a Gas and Oil Fuel Installation

The efficiency of the Forney Combination Gas and Oil Burner has resulted in its being selected for use by many of the largest central stations where economy and flexibility of changing quickly from one fuel to the other are of primary importance. Both natural and forced draft types are available. All units have a high capacity and can be operated with preheated air to meet the load requirements of modern ratings. Turbulent mixing of fuel and air result in complete and immediate combustion. It is a gas burner with no flame travel. An exclusive feature of the burner is that both the gas and oil elements can be easily and quickly cleaned with the boiler in service. Installations total over 500,000 boiler horsepower. Ruggedness of construction, low first cost and low maintenance cost are outstanding features of the equipment. Our engineering service insures most effective installations and permanently satisfactory results.

Forney Combustion Engineering Company

305 Thomas Building
Dallas, Texas

SPRAGUE SEMI-CHROME LEATHER

Resists acids
and boiling water.

Now Used in All

SPRAGUE METERS AND REGULATORS

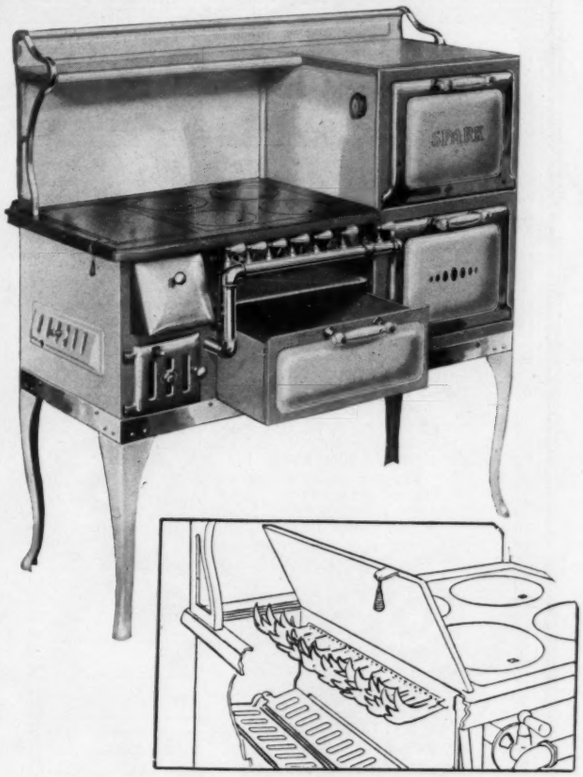
After

FIVE YEARS' TESTS AND EXPERIMENTS

May we send you
samples and data?

The Sprague Meter Co.

BRIDGEPORT, CONN.
Los Angeles, Calif., San Francisco, Calif.
Newark, Ohio
Davenport, Iowa Houston, Texas



The Patented Burner

"SPARK"

a Name on a Gas Stove

that has a "Patented" Built-in griddle—No other gas stove has—A feature that actually gives you ONE-HALF MORE gas cooking surface than any other gas stove of the same size. This feature alone

Will Help Sell This Gas Stove

It gives a salesman an opportunity to hold the attention of the buyer.

MANUFACTURED BY
Hammer-Bray Co.
Oakland California

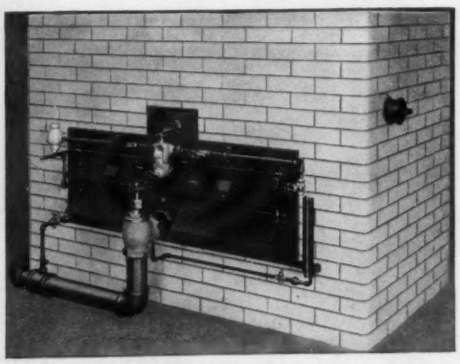
SAN FRANCISCO, 180 NEW MONTGOMERY

PORTLAND
330 Union Avenue No.

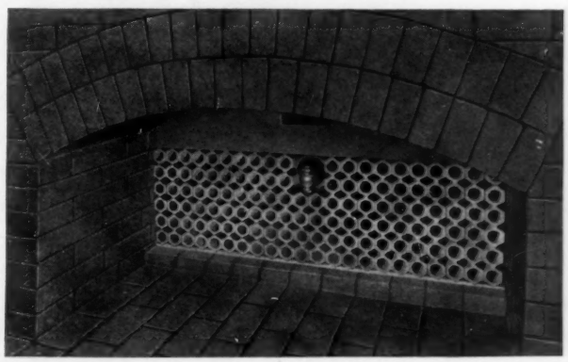
LOS ANGELES
7000 Avalon Boulevard

A change to the Multi-jet Unit

Insures Effiicency, Capacity and Satisfaction
The Recognized Better Gas and Oil Burning Unit



Front View—Showing Installation of Combination Gas and Oil Unit.



Rear View—Same Installation—Note All Parts of Gas Burner Exposed to Radiant Heat or Oil Burner Flame are Protected by Refractories, Insuring Long Life.

Its Many Exclusive Features Have Created an Exceptional Demand.
Designed for Front, Rear, and Vertical Firing.
Request Bulletin 19-E, which Explains the Many Reasons for This Great Demand.

For Modern, Inexpensive, Efficient Method of Burning Gas and Oil under Oil Field Boilers Request Bulletin 18-A and 20-A

Leahy Manufacturing Co.

(Established 1902) **1804-1810 E. 8th St. Los Angeles, Calif.**

DIRECTORY

Byllesby Engineering and Management Corporation

231 S. La Salle Street
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New York Pittsburgh San Francisco

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NATURAL GAS ENGINEERS
COMPRESSOR PLANT DESIGN AND CONSTRUCTION
P. O. BOX 669 LONG BEACH, CALIFORNIA

WALTER REID
CONSULTING NATURAL GAS ENGINEER
ATHLETIC CLUB BUILDING, DALLAS

SMITH-EMERY CO.
Chemists—Engineers
Established 1910
Analyses and tests. Represent Pittsburgh Testing Laboratory for inspection at Eastern foundries, mills and shops.
Offices & Laboratories
920 Santee St., Los Angeles
651 Howard St., San Francisco

WESTERN GAS from time to time receives requests from manufacturers asking to be put in touch with capable men or organizations in the Southwest or on the Pacific Coast who are able to effectively market their products in the western gas industry.

We also receive requests for suggestions from men or selling organizations covering the Pacific Coast as well as the Mid-Continent section, who desire to extend their activities in this industry by taking on new products or additional lines.

If we can be of service to you in this way, get in touch with any one of our three offices—Los Angeles, 124 West Fourth Street; Dallas, 307 Thomas Bldg.; San Francisco, 447 Sutter Street.

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WALWORTH
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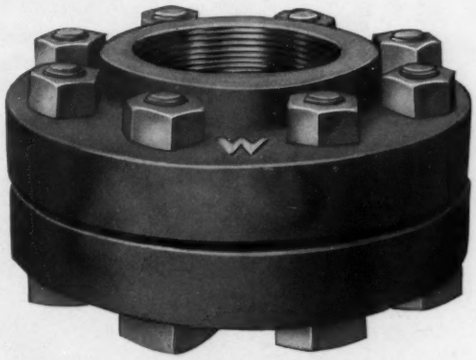
FITTINGS
AND TOOLS
for

GAS

KEWANEE FLANGE UNION

Available in all-iron for service in which fluids harmful to brass come in contact with the union.



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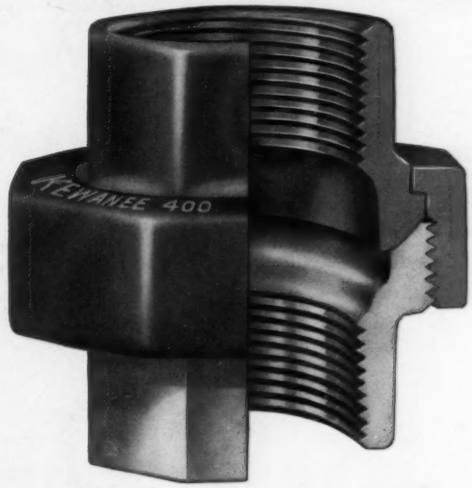

KEWANEE "400" UNION

Available in all-steel for higher pressures and temperatures.

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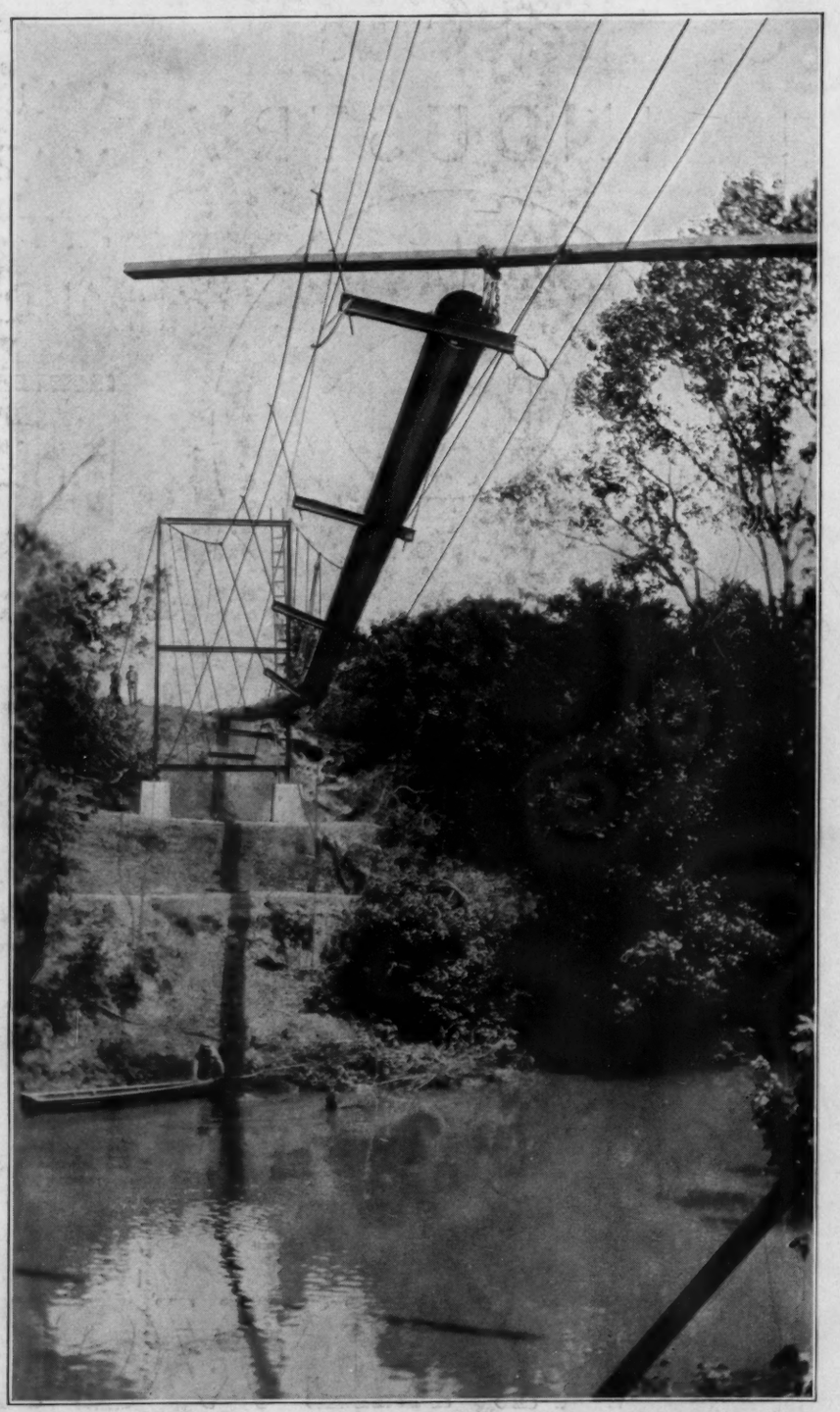
Plants at Boston, Mass.; Kewanee, Ill.; Greensburg, Pa.; and Attalla, Ala.
Walworth Company Limited, 620 Cathcart St., Montreal, P. Q.
Walworth International Co., 11 Broadway, New York, Foreign Representative

. . . Distributors in Principal Cities of the World . . .

NOT A SINGLE JOINT

HAS SHOWN A DEFECT DUE TO WORKMANSHIP OR MATERIAL



From a letter of Magnolia Gas Company, September 11, 1929, to Mr. L. R. Smith, President, A. O. Smith Corporation, Milwaukee, Wisconsin

"I want to take this opportunity of advising you that the two hundred and thirty odd miles of twelve, fourteen, eighteen, and twenty inch Smithweld pipe furnished by you for the building of the gas main line from Bruni, Webb County, Texas, to San Antonio and New Braunfels was as fine a lot of pipe as I have ever seen laid.

"The use of the bell and spigot and the expansion joint made possible the highest type of high pressure gas pipe line construction. The speed maintained in welding the joints in the field by the Smith Electric process enabled us to finish the welding much sooner than we had anticipated.

"The line was tested under high pressure. Several sections of it were closed in, and, over a ten-day period, did not show as much as a half pound drop, with temperature corrections; and not a single joint has shown a defect due to workmanship or material.

Yours very truly,

(Signed) Fred M. Lege, Jr.,

President."

A. O. SMITH CORPORATION

General Offices: Milwaukee, Wis.

Oil & Gas Field Products Division

District Offices at:

New York Tulsa Houston Los Angeles

SMITH*WELDED*

GAS LINE PIPE